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Studies on Leptospira Icterohemorrhagiae

The National Leper Home, Carville, La.

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UNITED STATES PUBLIC HEALTH SERVICE

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They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of public health.

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STUDIES ON LEPTOSPIRA ICTEROHEMORRHAGIAE

By J. R. Ridlon, *Senior Surgeon, United States Public Health Service*

Several thousand rats are examined monthly at the Federal laboratory, San Francisco, Calif. Opportunity was therefore offered to inquire into the presence of *Leptospira icterohemorrhagiae* among wild rats in this locality. Rats are ordinarily caught in snap traps, brought dead to the laboratory, and examined the following day. Most of the rats in this series were examined on the day after their capture in snap traps.

During March, 1930, 50 rats were examined as to the presence of *Leptospirae*.[1] One kidney was exposed, and with sterile forceps a small piece of macerated kidney tissue was rubbed up in a drop of salt solution and examined by dark-field illumination. Each slide was observed for about 10 minutes unless the organisms were found sooner. Only adult rats of the *norvegicus* species coming from areas near the slaughterhouse district and water front in San Francisco and Oakland were examined.

Leptospirae were found by dark-field examination in the kidneys of 17 rats, or about one-third of the total. No doubt a larger percentage could be found infected by more critical examinations and animal inoculations from rats captured alive.

Noguchi (1) describes and defines the morphology and characteristics of *Leptospira icterohemorrhagiae* and says that the American strains in wild rats are the same as the European and Japanese strains. The *Leptospirae* from rats' kidneys seen by dark field in this study apparently agree with the description of Noguchi as to size, shape, and motility.

Animal inoculations.—Kidneys from rats found to be infected upon dark-field examinations were ground up in salt solution and used for the inoculation of guinea pigs. Ten pigs were inoculated with material from 17 rats. Inoculations were made subcutaneously or by rubbing infected material on the shaved and abraded abdomen. Six pigs failed to develop leptospirosis.

[1] Acknowledgment is made of the assistance of Senior Surg. J. C. Perry, in charge of the laboratory, and Technicians M. Burkel and E. M. Tennis

Inoculations were successful in four pigs. These developed fever and jaundice of eyes, skin, and mucous membranes. One pig recovered, and at autopsy on the twenty-first day all internal organs were apparently normal and examinations for *Leptospirae* were negative. The remaining three pigs upon autopsy showed jaundice of subcutaneous tissues and hemorrhages of subcutaneous tissues, lungs, and intestines. These symptoms and findings in guinea pigs are typical of infection with *Leptospira icterohemorrhagiae*.

Emulsions of internal organs from these pigs were pathogenic in successive guinea-pig inoculations, and the strains were carried along for several passages, producing fever, with loss of appetite, emaciation, and jaundice. Pigs as a rule began to have fever in 3 to 6 days and died in 9 to 12 days. Temperature was subnormal for a day or two before death. Upon autopsy the lungs were found studded with punctate hemorrhagic areas. The spleen was usually normal in size but dark in color. The liver was usually normal in size, but often with a yellowish tinge and friable in consistency. Suprarenals were often found enlarged. Two pigs which recovered from the infection became blind. *Leptospirae* were frequently but not always found by dark-field examination of the organs of pigs showing typical symptoms of infection. They were found in the kidneys, urine, and liver tissue. It was noted after several months that the infection apparently became less virulent, and several pigs recovered after having fever and jaundice for several days.

Discussion.—Inada and his associates (2) in 1914 discovered the spirochetal origin of a severe febrile jaundice endemic in Japan. The same organism was later found by English, German, French, and Italian investigators in cases of febrile jaundice occurring among soldiers in the trenches, and it was agreed that the disease was the same as Weil's disease, which had been described in 1886. Inada describes the symptoms which occurred in guinea pigs injected with blood from human cases. Fever as high as 40° was present on the fourth to fifth day after intraperitoneal inoculation, with loss of appetite, conjunctival congestion, anemia, jaundice, and albuminuria. Hemorrhages were noted at autopsy. He describes the spirochete involved.

Noguchi (3) reports the finding of *Leptospira icterohemorrhagiae* in American wild rats in the vicinity of New York. This organism was pathogenic for pigs in 9 to 12 days and when cultivated was found to agree in agglutination and immunity reactions with *Leptospirae* cultivated in Japan and Europe. Jobbing and Eggstein (4) report the finding of *Spirocheta icterohemorrhagica* in at least 10 per cent of more than 100 rats examined in Nashville, Tenn. Guinea pigs, after inoculation, died in 12 to 14 days, showing jaundice of sclera and

mucous membranes before death and yellowing of subcutaneous tissues. Spirochetes were found in organs and urine.

Blumer (5) reports various epidemics of infectious jaundice occurring in the United States for the last 100 years and distinguishes these epidemics from the sporadic cases of Weil's disease, or *spirochetosis icterohemorrhagiae*. Ido and associates (6) report the finding of *Spirocheta icterohemorrhagiae* in the kidneys of 40.2 per cent of 149 *Mus decumanus* [*Rattus norvegicus*] and in 0.8 per cent of 24 *Mus* [*Rattus*] *alexandrinus* examined in Japan. When inoculated into guinea pigs it caused death in 8 to 11 days.

Langworthy and Moore (7) give a detailed discussion of infectious jaundice and Weil's disease. They report finding that about 40 per cent of 69 rats in Albany, N. Y., had *Leptospirae* in their kidneys. Guinea pigs, when inoculated, showed fever, jaundice, albuminuria, and, at autopsy, hemorrhages. The incubation period in pigs was about 48 hours, and death often occurred in 5 to 6 days.

Noguchi (8) found that 67 per cent of wild rats and mice tested in Guayaquil harbored in their kidneys a *Leptospira* which produced in guinea pigs symptoms and lesions identical with those produced by *Leptospira icterohemorrhagiae* derived from patients in Japan and Europe and wild rats from New York.

Middleton (9) examined 235 rats near Oxford, England, and demonstrated that about 41.7 per cent of them had *Leptospirae* in their kidneys.

Cameron (10) examined 78 rats in Toronto, Canada, and demonstrated *Leptospirae* in their kidneys in 37 per cent. This organism was pathogenic for guinea pigs, causing jaundice and capillary hemorrhages. McKinley (11) has also studied the same problem in the Philippine Islands and found a small percentage of infected rats. The organism has also been reported in rats from London, North Africa, and, more recently, from Russia.

The fact seems established that rats in many parts of the world harbor a *Leptospira* which is pathogenic for guinea pigs and is identical with the organism causing Weil's disease, or leptospirosis, with jaundice in humans. The identity has been established by immunity reactions between the human and rat strains.

Epidemiology.—Weil's disease is not found in extensive epidemics, but sporadic cases occur, chiefly among males exposed to contamination by dirty surface waters or damp soils. Most cases have been reported among troops in trenches, sewer workers, swimmers in canals, and those exposed to muddy water. It is possible that human infection comes through the broken skin contaminated by dirty water or mud.

Leptospira icterohemorrhagiae is not considered to be pathogenic for wild rats. On the other hand a proportion of adult rats of the

norvegicus species are probably chronic carriers of this organism, which is excreted in the urine and so contaminates soil and water. It may be spread from rat to rat by food contaminated with urine or by other means.

Free-living *Leptospirae* of a nonpathogenic type are also commonly found in surface waters and slime. The relationship of the pathogenic and nonpathogenic types is still a matter for study.

Morphology.—Noguchi describes the *Leptospira* as a tightly and regularly wound cylindrical filament tapering to sharply pointed extremities, and with hooks on one or both ends. It is active in motion, having a flexible wavy motion and a rotary motion forward and backward. Length is usually between 7μ and 14μ; it may be shorter or extend in length to 30μ. The number of spirals varies with the length, but the distance between spirals equals 0.5μ.

Staining.—Specimens from rats and guinea pigs were stained by Giemsa stain after the process recommended by Noguchi (1) with fairly satisfactory results. Staining is by no means as practical as the use of the dark field for the detection of infected rats.

Culture.—Attempts were made to culture the organism from the tissues of all guinea pigs which had lesions indicating infection with *Leptospira icterohemorrhagiae.* Four positive cultures were obtained, and three were used for the inoculation of pigs. Two cultures were obtained from kidney tissue, one from liver, and one from blood. Two of the pigs inoculated from cultures died from the infection and one recovered. These showed the characteristic symptoms of fever and jaundice and lesions with hemorrhages. The *Leptospira* media, as described by Noguchi (12), was used.

SUMMARY

Leptospirae were found in the kidneys of wild rats from San Francisco Bay cities. These apparently conform to the descriptions of *Leptospira icterohemorrhagiae.*

Guinea pigs were inoculated with material from the kidneys of rats harboring *Leptospirae* and died, showing fever and jaundice of the eyes and skin before death. At autopsy they showed subcutaneous jaundice and hemorrhages of subcutaneous tissues and internal organs, which are the gross pathological changes described by several writers as typical of infection with *Leptospira icterohemorrhagiae.*

Leptospirae were found in the internal organs and urine of infected guinea pigs. Positive cultures were obtained.

Guinea pigs were infected by injection of positive cultures. The disease was carried over in successive guinea-pig inoculations, both from original rat injections and from culture injections.

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THE NATIONAL LEPER HOME (UNITED STATES MARINE HOSPITAL), CARVILLE, LA.

Review of the More Important Activities During the Fiscal Year Ended June 30, 1930

By O. E. DENNEY, *Surgeon, United States Public Health Service, Medical Officer in Charge*

STATISTICAL

The continued gradual increase in the number of new lepers annually hospitalized suggests the prediction that the peak load has not yet been reached. Estimates made 10 years ago of the probable number of cases of leprosy in the United States, based on the number of reported cases, placed the leprosy population at about 1,100. Subsequent experience has taught that this estimate was very nearly correct.

During the fiscal year ended June 30, 1930, 112,923 days of relief were furnished, 55 new patients were admitted, 7 absconded, 6 absconders were readmitted, 1 was deported as not entitled to hospitalization at the expense of the Government, 22 died, 1 paroled patient returned with leprosy symptoms recurring, and 3 paroled patients returned for surgical or medical assistance required for the relief of symptoms only secondarily related to their former leprosy.

Twenty-three patients were paroled with leprosy arrested and as no longer a menace to public health; eight additional patients complied with the requirements for parole, but due to deformities and disfigurements which could not be corrected, these patients elected to remain in the hospital rather than be subjected to hardships and humiliations, the inevitable outlook of many paroled lepers.

Nativity of patients in hospital

Alabama	2	Hawaiian Territory	9	Pennsylvania	1
Arkansas	1	Indiana	1	Philippine Islands	7
Bahama Islands	2	India	2	Porto Rico	6
Bermuda Islands	2	Ireland	1	Portugal	3
Brazil	1	Italy	8	Rhode Island	1
British Guiana	2	Jamaica	1	Russia	6
British West Indies	5	Japan	1	Society Islands	1
California	5	Louisiana	103	South Carolina	1
Canada	2	Maryland	1	Spain	6
Cape Verde Islands	1	Mexico	37	Tahiti Islands	1
Central America	1	Mississippi	2	Texas	28
China	14	Missouri	1	Virginia	1
Dutch Guiana	1	New Jersey	1	West Indies	1
Finland	1	New York	2	Wisconsin	2
Florida	13	North Carolina	1		
France	1	Ohio	1		308
Georgia	3	Palestine	1		
Greece	12	Panama	1		

Admissions July 1, 1929–June 30, 1930, by State or country

Alabama	1	Indiana	1	Spain	2
Brazil	1	Italy	1	Tahiti	1
British West Indies	1	Louisiana	20	Texas	5
California	1	Mexico	13	Wisconsin	1
Germany	1	Philippine Islands	1		
Georgia	1	Porto Rico	1		55
Hawaii	1	Russia	2		

LEPRA THERAPY

There were admitted to the infirmaries 186 patients—126 males and 60 females. Approximately 20 men and women are permanently invalided, due to debilities which render them helpless.

On many occasions both men's and women's infirmaries have been so crowded that it has been necessary to treat patients in their quarters. The average stay in the infirmary for patients admitted for acute conditions was two weeks, although a number remained as long as three to four months.

Of the 308 patients, 163 are taking chaulmoogra oil by mouth as routine treatment, the dosage ranging from 5 drops to 375 drops daily. One hundred and twenty patients are taking biweekly intramuscular injections of benzocaine-chaulmoogra oil, 5 c. c. at each injection, as routine treatment; and a survey of this group shows a general improvement in nearly all patients.

The out-patient clinic has cared for 754 patients during the past year. This number includes station employees and their families.

Twenty patients were under experimental treatment with vaccinated calf serum during the year, 10 of whom continued throughout the year, during which time 650 injections of 1.5 c. c. at weekly

intervals have been given. Three of these patients have had one or two negative bacteriological tests for the first time, but later showed positive tests. All but one have been free of marked leprous reactions and have shown general improvement, with quite noticeable clearing of extensive skin manifestations in several.

The local irritation produced by the unconcentrated serum is quite severe but disappears within 24 hours, with little or no general symptoms. Three patients showed immediate reaction symptoms, relieved by adrenalin, and subsequently discontinued the treatment.

A group of nine recent admissions were given four weekly injections of 1.5 c. c. of vaccinated calf serum taken one month after height of vaccinia, and were then vaccinated with smallpox vaccine by pressure method. Five of these showed previous scars and gave immune reactions; the other four gave typical takes. It seems probable, therefore, that the serum of vaccinated calves does not carry immune bodies, at least sufficient in dosage given to produce immune effect.

The use of mercurochrome with glucose intravenously in dosage just below that giving sharp reaction has continued to give good results in the comparatively few cases in which it has been used. The use of mercurochrome in similar dosage, alternating with sulpharsphenamine, in patients showing resistant positive Kolmer and Kahn tests has been recently tried, and of 7 patients the Kolmer has been changed favorably in 5, the Kahn in 4, and in 3 patients the change was in agreement Only one case showed a negative test (Kolmer). In view of the practical difficulty in giving mercury to leper patients taking chaulmoogra oil by mouth and intramuscularly, this experiment will be continued in a larger group.

One patient who had improved under mercurochrome, which had to be discontinued on account of vein obliteration, was given neutral acriflavine orally in keratinized capsules, with exposure to ultraviolet light two hours after the daily dose of the drug. During about three months of this treatment, the patient has continued general improvement.

High-frequency fulguration by dessication and coagulation has given good service in removal of discrete leprous nodules, and even large patches. The smaller areas show practically no scars, and the larger leave smooth pliable scar tissue.

Following the recent introduction of para-thio-cresol as a stimulator of healthy granulation tissue, this preparation is being used experimentally. The results so far indicate that a valuable means for such cell stimulation has been found.

DERMATOLOGIC SERVICE

A survey of the total number of patients in the leprosarium, made during the last year, revealed the fact that certain anatomical skin

regions were comparatively more immune to leprous nodular lesions than were other skin areas. The results of this investigation were published in the Archives of Dermatology and Syphilology.

Twenty-five patients are being given weekly intramuscular injections of hydnocarpus ethyl esters. The maximum dose up to the present time has been 3 c. c. There has been but little discomfort caused by the injections, either locally or from systemic reaction. No abscesses have resulted nor has there been any appreciable infiltration in the gluteal muscles at the site of injection. The esters were obtained through the courtesy of Dr. H. I. Cole, of the Philippine Health Service, Culion Leper Colony, P. I. It is thought that improvement in some cases might be attributed to this medication.

The ethyl esters of chaulmoogra oil are still being administered intramuscularly, but to a diminishing number of patients. The decrease in the popularity of the ethyl esters may, in part, be due to a disposition on the part of patients to seek relief by some of the newer treatments, especially the successful combination of chaulmoogra and benzocaine.

Glandular extracts are still being administered in a few selected cases. Up to the present time there has not been noted any marked influence on the course of leprosy from the administration of these extracts which, until now, have been given in very small doses.

It is still noted that crude chaulmoogra oil, by oral administration is of benefit in those cases in which there is a tolerance for large doses. Arsenic by mouth (Fowler's solution) is being used in those patients whose lesions exhibit acute inflammation. The arsenic seems to be of great benefit in this type, especially in those cases in which in addition to the inflammatory reaction in skin and nerve, there is also elevation of body temperature.

EYE, EAR, NOSE, AND THROAT SERVICE

The seriousness of eye conditions coexisting with leprosy, prompted the hospital, in 1922, to begin intensive work with the hope that treatment might alleviate some suffering and that prophylaxis might retard the appearance of new eye disorders.

During the ensuing eight years, much has been accomplished and the results have more than justified the effort. Prophylaxis was not entirely satisfactory, however, and a broadening of the field for further experimentation was suggested, and the scope of the opthalmologic clinic has been enlarged to include ear, nose, and throat.

Students of leprosy have long known of the devastation of leprosy in the nasal passages and of the progress of the disease into the respiratory tracts. The nasal passages frequently show definite pathology of leprosy before symptoms of eye disease are detected. It therefore seems a logical step to concentrate on these contiguous regions with

NEW ENTRANCE GATE TO THE NATIONAL LEPER HOME

NEW KITCHEN AND MESS HALL

OBSERVATION TOWER BUILT BY PATIENTS FROM WHICH TO WATCH THE RIVER TRAFFIC

VIEW OF SOME OF THE PATIENTS' COTTAGES FROM THE OBSERVATION TOWER

the hope that leprous invasion might be stopped in its local position and not be permitted to invade the eye regions by mechanical contamination from the nasal discharges or otherwise.

The treatment of nasal lesions is being carried on by daily local treatments in more than 200 lepers, and the results of this experiment will be the subject of subsequent report.

NEUROPSYCHIATRIC SERVICE

During the fiscal year, 45 new patients, ranging in age from 10 to 72 years were examined, 33⅓ per cent of whom were in their third decade of life. There were 30 males and 15 females of various nationalities, Mexican predominating (26 per cent). Seventy-nine old patients were examined and advised therapeutically concerning neurological manifestations.

While routine neurological examinations were made, it became quite evident that many of the painful manifestations of leprosy were due to involvement of nerve roots, clinical evidence of the encroachment of the lepra organism in more centrally located nerve tissue.

Twenty-three patients, candidates for parole, were examined. Many of these presented marked improvement in their neurological symptoms. Some who presented marked evidence of sensory modality changes were found greatly benefited and normal sensation reappeared.

At the time of this report seven patients were confined to the psychopathic ward, and there was an equal number with abnormal mental conditions not requiring confinement. One female patient, after a severe manic depressive episode of 13 months' duration, is showing marked improvement. It is known that this is not her first manifestation of this complication. One male patient, after satisfying parole requirements, developed a psychoneurotic manifestation of the hysterical type. This soon cleared after his return home on parole. One patient of the paranoid dementia præcox type caused considerable concern.

One patient soon after his admission to the hospital developed epileptoid convulsions, which increased in number and severity, often taking the form of status epilepticus. During the latter month or so of his life he was almost continually in a state of convulsion. All therapeutic and dietetic measures proved to be unavailing. The gross post-mortem findings showed an edematous brain. The brain now preserved in formalin is the subject of minute pathologic study.

One patient showed marked amelioration, if not complete disappearance, of prolonged melancholic state. This improvement in his mental condition followed *pari pasu* the amelioration in his leprous condition. At the time of examination before his discharge, this depressed and melancholic state had completely disappeared.

One patient, after a stay of 5½ years in this institution, still presented a catatonic type of schizophrenia. After his leprosy had been arrested, he was returned to his home.

A tentative survey of the personality reactions of the individual patients with a view of determining abnormal reactions in this sphere is in progress. Insufficient data precludes a report at this time.

ORTHOPEDIC SERVICE

The majority of cases under treatment have attended regularly and persistently. Marked improvement has been noted in some, and gradual improvement in all cases applying for treatment regularly.

Hot boracic acid soaks followed by wet compresses of the same have continued to produce the best results in ulcerative and suppurative conditions of the hands and feet.

During the year Viosterol (irradiated ergosterol) has been used in certain bone cases where necrosis and suppurations were present and also in certain ulcerative skin lesions. In these cases the lesions healed more rapidly than similar lesions in patients not taking Viosterol; the patients report feeling better, possessing more energy, and have gained weight.

A few patients with claw hand deformity have consented to wear splints during the night and an earlier correction of such deformaties is to be anticipated.

DENTAL SERVICE

Dental service continues with an increase of treatments rendered owing to increase of patients admitted to the hospital. A gradual decrease in the percentage of oral ulcers and pyorrhea alveolaris has been observed. In two patients recently admitted, sections were made of gum tissue labially of incisors, which revealed presence of organisms morphologically resembling Hansen's bacillus.

Dental service has consisted principally of full and partial denture constructions, extractions, miscellaneous treatments, crown and bridge work, prophylaxis, and, in a small percentage of patients, postoperative treatments.

X-RAY DEPARTMENT

The routine Röntgenologic examination of lepers has continued with increasing interest. The bone pathology of leprosy is so complex and the pictures are so susceptible to variations due to physical and technical factors, that interpretations, particularly of progress, are made only with great caution. Much of the work has been

the reexamination of patients under observation for deficiencies in deposition of calcium, the clinical experiments being observed and in a measure controlled through X-ray and blood serum analysis.

The recognition of the different degrees of decalcification and resorption require the most balanced judgment. Normal individuals and advanced cases of nerve leprosy, with marked calcium unbalance, have been rayed on the same plate and the pictures were sometimes indistinguishable from each other. The main factors, which are prominent in effecting the decalcification of bone, are present in a very large majority of our cases, namely, chronic infection, local vascular disturbances, nerve involvement, disuse, and probably other unknown factors.

Besides the common leprotic changes presented in a bone picture of leprosy, which include atrophy, hypertrophy, resorption to the extent of complete disappearance of the phalanges of both hands and feet, there is presented also marked rarefaction. The clinical, Röntgenologic, and physiochemical data in many of our cases do not correlate, a high calcium balance showing, very often, a marked osteoporosis and vice versa.

LABORATORY SERVICE

Experimental.—During the last 12 months several experimental treatments have been supervised by the laboratory section. Fifty-nine patients received 2,433 subcutaneous injections of smallpox virus. Some very encouraging results were noted. Local heat applications to circumscribed lepromata on the exposed surfaces of the body continue in popularity with the patients, and 666 such treatments were given during the year.

Encouraging results have been obtained by the addition of antineuritic vitamine "B" to the diet of certain cases, particularly those who have been showing chronic toxic symptoms of intestinal origin. The action of antirachitic vitamine "D" contained in preparations of Viosterol (irradiated ergosterol), cod-liver oil, and irradiated yeasts, and of paroidin (parathyroid extract), both with and without the addition of calcium lactate, is being studied on the total calcium, diffusible calcium, and phosphorus of the sera of lepers and also on the clinical symptoms of patients who are deficient in diffusible calcium. A preliminary report of this work is being submitted for publication.

Laboratory examinations.—The following blood examinations were made during the year:

Kolmer's quantitative complement fixation	179	Blood albumens	45
Kahn's precipitation test	179	Erythrocyte sedimentation	123
Erythrocyte counts	48	Creatinine	1
Leucocyte counts	117	Hydrogen ion concentration	18
Differential leucocyte counts	118	Sugar	3
Malaria	100	Urea nitrogen	1
Blood serum calcium total	289	Uric acid nitrogen	1
Blood serum calcium diffusible	289	Total nitrogen	8
Blood serum inorganic phosphorus	282	Cholesterol	2
Blood proteins	56	Hemoglobin	42
Blood globulins	45	Chloride	2
		Unclassified	11
		Coagulation time	4

Miscellaneous laboratory examinations during the year totaled 5,280, in addition to which 508 clinical photographs were made.

NURSING SERVICE

There exists, as in the past, a commendable spirit of cooperation and enthusiasm on the part of the nursing staff. This attitude of the nursing staff is especially essential to vitalize the work, which in its nature so severely taxes the physical and mental resources of the individual. The range of efficiency of the patient-orderly personnel is considerably reduced by the fact that all the leper orderlies and attendants are handicapped by a disabling chronic disease which reduces their output approximately 50 per cent.

FARM AND DAIRY

The dairy at present consists of 68 milch cows, 4 bulls, and 11 young stock. There were 41,893 gallons of milk produced in the last 12 months, at a saving of $2,840.29. Pork, beef, fruit, vegetables and alfalfa hay produced on the 64 acres of pasture land and 26 acres of agricultural land effected a saving of $2,583.91, making a total saving on farm and dairy of $5,424.20 for the 12-month period. Sixty-nine acres of swamp land are a total loss, due to overflows after rains, rendering this area useless for either pasture or planting.

MAIL AND LIBRARY

Outside of regular office routine, the incoming and outgoing mail for the station consists of approximately 90,000 letters yearly and 100,000 papers, books, magazines, and packages. Of this number 10 daily newspapers and 40 monthly and weekly magazines are purchased by the Government for use by the patients.

During the fiscal year 89 volumes of popular fiction were purchased from the "Leper Patients' Benefit Fund."

DEATHS DURING WEEK ENDED DECEMBER 13, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended December 13, 1930, and corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended December 13, 1930	Corresponding week, 1929
Policies in force	75, 006, 785	75, 198, 818
Number of death claims	14, 526	14, 796
Death claims per 1,000 policies in force, annual rate	10. 1	10. 3

Deaths [1] from all causes in certain large cities of the United States during the week ended December 13, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Dec 13, 1930				Corresponding week 1929		Death rate [2] for first 50 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Total (78 cities)	7, 686	11 6	684	[4] 55	13 3	764	11 9	12 7
Akron	46	9. 4	6	55	8 7	4	7 8	9 4
Albany [5]	38	15. 5	3	62	18. 2	6	14. 8	16. 3
Atlanta	86	16. 7	11	112	15. 5	10	15 5	16 0
White	41		3	48		3		
Colored	45	(6)	8	230	(6)	7	(6)	(6)
Baltimore [5]	169	12. 3	12	42	16 8	16	14. 0	14. 6
White	147		10	44		9		
Colored	42	(6)	2	32	(6)	7	(6)	(6)
Birmingham	46	9. 2	4	38	13 9	7	13 6	15 8
White	22		1	16		1		
Colored	24	(6)	3	73	(6)	6	(6)	(6)
Boston	212	14. 1	18	52	14 2	17	14 0	14. 9
Bridgeport	30	10 6	4	68	8 2	4	10 8	11. 9
Buffalo	122	11 1	14	62	16 4	16	12 9	14 0
Cambridge	26	11. 9	3	60	13 8	4	11 8	12 6
Camden	28	12. 5	5	88	20 9	8	13 6	14 4
Canton	19	9 4	2	53	8 5	1	9 8	11 2
Chicago [5]	708	10. 9	61	54	11 7	64	10 4	11. 3
Cincinnati	124	14. 4	7	41	16 7	12	15 6	17 0
Cleveland	174	10 0	15	45	13 8	22	11. 0	12. 4
Columbus	86	15 5	9	89	15 5	7	15. 4	14. 8
Dallas	53	10. 5	7		14 8	4	11 4	11. 6
White	42		6			3		
Colored	11	(6)	1		(6)	1	(6)	(6)
Dayton	44	11. 4	1	15	13 0	5	10 8	11. 5
Denver	93	16. 8	3	33	16 1	8	14 9	14 8
Des Moines	29	10. 6	3	55	7 0	1	11 6	11 5
Detroit	258	8 5	46	71	10 9	57	9 2	11 1
Duluth	28	14. 4	2	54	12 4	1	11 5	11 5
El Paso	35	17 8	9		19 2	7	17 1	19 4
Erie	18	8. 1	2	44	13 2	7	11 0	12 0
Fall River [5,7]	19	8. 7	0	0	15 0	0	11 6	13 4
Flint	17	5 6	5	59	6 9	3	9 0	10 6
Fort Worth	83	10 7	8		9 5	4	11 0	12 3
White	18		2			3		
Colored	15	(6)	1		(6)	1	(6)	(6)
Grand Rapids	39	12. 0	8	45	6. 3	3	10 2	10. 1
Houston	77	13. 7	10		11. 9	4	12. 3	12. 6
White	49		5			3		
Colored	28	(6)	5		(6)	1	(6)	(6)
Indianapolis	82	11 7	5	38	15. 9	9	14 4	14. 8
White	68		4	35		9		
Colored	14	(6)	1	58	(6)	0	(6)	(6)
Jersey City	55	9 1	6	52	12. 9	6	11. 8	12. 4
Kansas City, Kans	28	11. 9	1	23	11. 6	1	11. 7	12. 7
White	25		1	28		1		
Colored	3	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo	97	12. 8	3	25	14. 9	13	13 4	14. 0
Knoxville	30	14. 7	1	23	11. 1	3	13. 5	13. 8
White	22		1	26		2		
Colored	8	(6)	0	0	(6)	1	(6)	(6)

Footnotes at end of table.

Deaths [1] *from all causes in certain large cities of the United States during the week ended December 13, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*—Continued

City	Week ended Dec. 13, 1930				Corresponding week 1929		Death rate [2] for first 50 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Los Angeles	258	10.8	28	85	14.2	28	11.0	11.3
Louisville	49	8.3	3	26	17.8	5	13.4	15.2
White	33		3	30		5		
Colored	16	(6)	0	0	(6)	0	(6)	(6)
Lowell [7]	23	12.0	1	26	15.5	2	13.3	14.1
Lynn	30	15.3	2	56	18.4	5	10.4	11.4
Memphis	72	14.8	9	106	15.0	4	16.9	18.9
White	43		4	72		3		
Colored	29	(6)	9	168	(6)	1	(6)	(6)
Milwaukee	107	9.8	11	48	12.0	18	9.8	10.9
Minneapolis	120	13.5	14	92	10.6	3	10.8	10.8
Nashville	42	14.9	3	47	22.0	3	17.2	18.7
White	26		3	63		3		
Colored	16	(6)	0	0	(6)	0	(6)	(6)
New Bedford [7]	19	8.8	2	51	11.5	3	10.9	11.9
New Haven	29	9.3	3	46	16.4	3	12.5	13.5
New Orleans	152	17.3	18	100	20.5	15	17.4	17.8
White	87		11	93		9		
Colored	65	(6)	7	113	(6)	6	(6)	(6)
New York	1,368	10.2	117	49	11.9	114	10.7	11.3
Bronx Borough	178	7.3	11	32	8.2	18	7.8	8.2
Brooklyn Borough	470	9.4	32	31	10.6	43	9.7	10.2
Manhattan Borough	528	14.9	54	69	17.5	38	16.0	16.3
Queens Borough	155	7.4	16	64	9.0	13	7.0	7.6
Richmond Borough	37	12.2	4	78	12.5	2	13.9	15.9
Newark, N. J	99	11.6	4	21	14.2	8	11.9	12.7
Oakland	63	11.5	2	25	11.4	6	11.0	11.3
Oklahoma City	36	10.1	1	18	14.5	6	11.0	11.0
Omaha	68	16.5	7	85	12.8	2	13.5	13.5
Paterson	22	8.3	2	35	17.7	4	12.0	13.4
Philadelphia	461	12.2	48	71	13.7	46	12.5	13.1
Pittsburgh	193	15.0	19	67	15.5	30	13.8	14.8
Portland, Oreg	66	11.5	3	37	12.3	4	12.2	12.7
Providence	52	10.8	5	46	17.9	7	12.9	14.5
Richmond	55	15.7	5	73	14.6	6	14.9	16.2
White	27		3	66		3		
Colored	28	(6)	2	85	(6)	3	(6)	(6)
Rochester	55	8.8	4	36	13.1	6	11.6	12.3
St. Louis	212	13.4	7	24	15.7	10	14.0	14.6
St. Paul	56	10.7	2	20	11.3	4	10.1	10.6
Salt Lake City [5]	40	14.8	4	63	12.4	2	12.6	13.0
San Antonio	68	13.8	5		17.9	9	14.3	14.7
San Diego	45	15.7	1	21	20.0	8	14.5	15.1
San Francisco	170	14.1	9	61	13.3	5	13.2	13.1
Schenectady	19	10.3	2	62	13.7	1	11.1	12.1
Seattle	87	12.5	8	81	10.4	7	10.9	11.2
Somerville	21	10.5	3	95	10.6	0	9.6	9.2
Spokane	22	9.9	0	0	16.3	2	12.4	12.8
Springfield, Mass	32	11.1	2	34	13.4	3	12.0	12.6
Syracuse	42	10.5	4	49	11.4	6	11.7	12.9
Tacoma	38	18.5	2	55	11.8	2	12.5	11.8
Toledo	76	13.6	9	83	15.2	5	12.6	13.7
Trenton	41	17.4	5	96	18.7	6	16.7	17.0
Utica	17	8.6	0	0	10.2	8	14.4	15.4
Washington, D. C	133	14.2	9	53	17.0	17	15.2	15.4
White	76		6	52		12		
Colored	57	(6)	3	54	(6)	5	(6)	(6)
Waterbury	19	9.8	2	49	9.8	4	9.4	9.3
Wilmington, Del. [7]	30	14.9	4	96	11.9	8	14.6	13.8
Worcester	51	13.5	3	42	8.5	3	12.6	12.5
Yonkers	23	8.8	5	119	10.2	1	8.1	9.4
Youngstown	36	11.0	3	43	13.9	6	10.4	12.3

[1] Deaths of nonresidents are included. Stillbirths are excluded.

[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method

[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births

[4] Data for 73 cities.

[5] Deaths for week ended Friday.

[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38, Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended December 20, 1930, and December 21, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 20, 1930, and December 21, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec 20, 1930	Week ended Dec 21, 1929	Week ended Dec 20, 1930	Week ended Dec 21, 1929	Week ended Dec 20, 1930	Week ended Dec 21, 1929	Week ended Dec 20, 1930	Week ended Dec 21, 1929
New England States:								
Maine	5	1	2	21	37	6	0	0
New Hampshire	1	5	------	------	26	13	0	0
Vermont	3	1	------	------	------	6	0	0
Massachusetts	79	126	6	9	308	89	1	1
Rhode Island	7	4	------	------	------	1	0	0
Connecticut	14	21	2	9	77	4	0	3
Middle Atlantic States:								
New York	118	171	[1] 23	[1] 63	136	568	10	16
New Jersey	79	116	18	15	140	78	1	7
Pennsylvania	147	150	------	------	457	391	7	6
East North Central States:								
Ohio	42	43	9	18	87	557	0	4
Indiana	38	19	12	------	125	21	3	18
Illinois	173	223	8	24	290	322	11	10
Michigan	64	99	8	4	49	113	5	15
Wisconsin	21	21	24	32	197	580	1	4
West North Central States:								
Minnesota	20	26	------	2	5	131	1	1
Iowa	17	6	------	------	4	131	2	0
Missouri [2]	17	36	4	13	6	30	3	16
North Dakota	2	2	------	------	------	20	0	0
South Dakota	13	------	------	------	2	14	0	1
Nebraska	18	20	8	------	------	140	0	1
Kansas	15	24	1	1	7	71	1	2
South Atlantic States:								
Delaware	3	3	------	3	2	------	0	0
Maryland [3]	32	24	14	53	38	15	1	1
District of Columbia	14	13	1	1	16	------	0	0
West Virginia	84	20	26	13	23	221	0	1
North Carolina	76	73	16	39	52	3	0	0
South Carolina	19	20	516	653	------	------	0	0
Georgia	16	11	81	63	25	14	2	0
Florida	24	12	1	2	38	9	1	0

[1] New York City only. [2] Figures for 1930 are exclusive of St. Louis. [3] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 20, 1930, and December 21, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec 20, 1930	Week ended Dec 21, 1929	Week ended Dec 20, 1930	Week ended Dec 21, 1929	Week ended Dec 20, 1930	Week ended Dec 21, 1929	Week ended Dec 20, 1930	Week ended Dec. 21, 1929
East South Central States:								
Kentucky						189	0	0
Tennessee	19	4	76	63	29	7	1	2
Alabama	43	82	91	117	61	9	0	1
Mississippi	20	29					2	1
West South Central States.								
Arkansas	5	14	28	102		4	0	7
Louisiana	26	41	10	25		16	1	9
Oklahoma [4]	47	45	57	84	38	28	2	2
Texas	55	112	60	80	51	10	1	0
Mountain States:								
Montana	6	4			1	14	1	1
Idaho					10	58	1	0
Wyoming	2	2	2		1		0	0
Colorado	10	7			17	27	0	6
New Mexico	10	5	16	6	76	1	0	4
Arizona	5	15	2	29	15	4	4	9
Utah [3]	2	3	18		2	25	2	3
Pacific States								
Washington	24	6		2	20	67	0	2
Oregon	7	13	10	17	46	11	0	1
California	61	78	73	42	223	216	5	10

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 20, 1930	Week ended Dec. 21, 1929	Week ended Dec. 20, 1930	Week ended Dec 21, 1929	Week ended Dec 20, 1930	Week ended Dec 21, 1929	Week ended Dec. 20, 1930	Week ended Dec. 21, 1929
New England States:								
Maine	0	0	33	51	0	0	7	10
New Hampshire	0	0	1	21	0	0	1	0
Vermont	0	0	5	11	0	1	0	0
Massachusetts	8	1	206	255	0	0	4	5
Rhode Island	0	0	22	16	0	0	0	0
Connecticut	0	1	87	85	0	0	8	3
Middle Atlantic States:								
New York	3	0	464	336	4	10	16	10
New Jersey	1	1	172	146	0	0	4	4
Pennsylvania	5	1	450	418	0	2	20	19
East North Central States:								
Ohio	3	2	367	187	49	161	19	7
Indiana	0	1	199	76	71	119	5	8
Illinois	6	0	344	491	61	115	16	14
Michigan	8	4	191	263	45	35	5	1
Wisconsin	12	0	146	102	7	40	5	9
West North Central States:								
Minnesota	7	1	55	126	13	11	1	3
Iowa	3	2	90	65	33	85	3	4
Missouri [1]	1	0	55	85	7	30	4	13
North Dakota	0	0	21	24	9	18	3	1
South Dakota	2	0	17	19	16	17	1	0
Nebraska	3	1	61	50	81	62	1	1
Kansas	1	0	50	96	33	37	5	6
South Atlantic States:								
Delaware	0	0	11	5	0	0	0	1
Maryland [3]	0	0	92	82	0	0	10	4
District of Columbia	1	0	22	22	0	0	2	0
West Virginia	2	1	53	60	9	25	18	7
North Carolina	1	2	65	74	8	13	8	3
South Carolina	1	0	21	8	0	8	11	7
Georgia	0	0	51	4	0	0	5	0
Florida	1	1	12	17	0	5	1	1
East South Central States:								
Kentucky	1	0	34	23	0	5	18	7
Tennessee	0	0	20	17	2	7	2	0
Alabama	0	1	54	30	1	4	2	22
Mississippi	0	0	21	21	4	0	7	5

[1] Figures for 1930 are exclusive of St. Louis.
[3] Week ended Friday.
[4] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 20, 1930, and December 21, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 20, 1930	Week ended Dec. 21, 1929	Week ended Dec. 20, 1930	Week ended Dec. 21, 1929	Week ended Dec. 20, 1930	Week ended Dec. 21, 1929	Week ended Dec. 20, 1930	Week ended Dec. 21, 1929
West South Central States:								
Arkansas	0	1	8	23	3	6	18	2
Louisiana	0	0	15	17	6	2	35	13
Oklahoma [4]	1	0	31	47	44	26	24	6
Texas	4	0	43	56	22	23	13	3
Mountain States:								
Montana	0	0	25	47	26	9	0	2
Idaho	1	0	4	16	1	14	0	0
Wyoming	0	0	21	6	1	7	0	0
Colorado	0	2	10	20	0	51	0	0
New Mexico	1	0	5	6	1	1	1	0
Arizona	0	0	9	12	2	11	2	1
Utah [3]	0	0	8	12	0	1	1	0
Pacific States:								
Washington	0	1	51	63	18	59	3	1
Oregon	0	1	4	53	1	13	0	1
California	19	1	84	223	54	59	10	8

[3] Week ended Friday.
[4] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
November, 1930										
Indiana	13	250	33		350		29	829	233	54
Iowa	3	55			12		28	256	45	23
Maine	2	24	2		138		15	93	0	64
Michigan	21	347	20	1	206		35	819	132	44
New Jersey	13	258	43	1	452		7	539	0	31
New Mexico	5	27		28	55	1	7	16	0	23
New York	38	374		4	526		49	1,401	30	107
Ohio	20	320	49	2	145		95	1,707	198	125
Pennsylvania	23	503			1,011	1	17	1,663	1	156
South Carolina		325	2,584	2,256	25	309	7	133		107
Tennessee	27	318	200	71	69	13	8	380	13	135
West Virginia	4	132	145		75		7	287	113	139

November, 1930

	Cases
Anthrax:	
New Jersey	1
Pennsylvania	1
Chicken pox:	
Indiana	684
Iowa	342
Maine	199
Michigan	1,352
New Jersey	905
New Mexico	54
New York	2,135
Ohio	2,401
Pennsylvania	2,799
South Carolina	181
Tennessee	332
West Virginia	317
Conjunctivitis:	
New Mexico	2
Dengue:	
South Carolina	14
Diarrhea and enteritis (under two years):	
Ohio	48
Dysentery:	
Michigan	1
New York	48
Ohio	1
Pennsylvania	5
Tennessee	3
German measles:	
Iowa	1
Maine	9
New Jersey	27
New York	131

German measles—Continued.	Cases
Ohio	13
Pennsylvania	38
South Carolina	20
Glanders	
Indiana	1
Hookworm disease.	
South Carolina	93
Impetigo contagiosa:	
Iowa	2
Tennessee	10
Lead poisoning	
New Jersey	3
Ohio	10
Pennsylvania	1
Leprosy	
Indiana	1
Lethargic encephalitis	
Indiana	17
Maine	1
Michigan	6
New Jersey	1
New York	9
Ohio	1
Pennsylvania	6
South Carolina	3
Tennessee	1
Mumps	
Indiana	23
Iowa	45
Maine	235
Michigan	252
New Jersey	44
New Mexico	14
New York	513
Ohio	311
Pennsylvania	646
South Carolina	70
Tennessee	62
Ophthalmia neonatorum	
New Jersey	2
New Mexico	2
New York	4
Ohio	79
Pennsylvania	15
South Carolina	16
Tennessee	1
Paratyphoid fever	
Maine	2
New Jersey	3
New York	5
Ohio	1
South Carolina	16
Puerperal septicemia.	
New York	7
Ohio	8
Pennsylvania	12
Tennessee	1

Rabies in animals:	Cases
New York	8
South Carolina	14
Rabies in man	
New Jersey	1
Septic sore throat:	
Indiana	1
Maine	1
Michigan	41
New York	26
Ohio	2
Tennessee	10
Tetanus:	
New Jersey	2
New York	5
South Carolina	2
Trachoma:	
Indiana	2
New Jersey	2
New York	1
Ohio	8
Pennsylvania	3
Tennessee	2
Trichinosis	
New Jersey	5
Pennsylvania	4
Tularaemia	
Indiana	6
Ohio	8
Pennsylvania	1
Tennessee	4
West Virginia	2
Typhus fever	
South Carolina	2
Undulant fever.	
Iowa	11
Michigan	1
New Jersey	4
New York	18
Ohio	11
Pennsylvania	4
South Carolina	1
Tennessee	1
Vincent's angina:	
Iowa	9
Maine	6
New York [1]	69
Tennessee	3
Whooping cough:	
Indiana	104
Iowa	25
Maine	219
Michigan	503
New Jersey	337
New Mexico	2
New York	1,407
Ohio	220
Pennsylvania	545
Tennessee	78
West Virginia	112

[1] Exclusive of New York City

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 94 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 31,920,000. The estimated population of the 88 cities reporting deaths is more than 30,360,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended December 13, 1930, and December 14, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria			
46 States	1,722	2,270	
94 cities	550	807	1,071
Measles			
45 States	3,213	4,175	
94 cities	1,020	684	
Meningococcus meningitis			
46 States	121	189	
94 cities	47	91	
Poliomyelitis			
46 States	80	27	
Scarlet fever			
46 States	1,231	4,487	
94 cities	1,401	1,678	1,180
Smallpox			
46 States	495	1,342	
94 cities	89	142	36
Typhoid fever			
46 States	342	235	
94 cities	70	37	40
Deaths reported			
Influenza and pneumonia			
88 cities	[illegible]87	[illegible]49	
Smallpox			
88 cities	0	0	

City reports for week ended December 13, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	2	1	0		0	3	1	3
New Hampshire								
Concord	0	0	0		0	0	0	4
Vermont:								
Barre	0	0	0		0	1	0	0
Burlington	2	0	0		0	0	0	0
Massachusetts:								
Boston	91	30	26	3	1	51	8	27
Fall River	36	4	2		0	0	0	0
Springfield	32	5	2		0	2	11	6
Worcester	27	6	8		0	2	0	0

City reports for week ended December 13, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND—con.								
Rhode Island:								
Pawtucket	3	2	4	—	0	1	0	1
Providence	14	10	8	—	0	0	0	1
Connecticut:								
Bridgeport	0	6	0	1	1	0	0	1
Hartford	4	7	3	—	0	41	1	0
New Haven	14	2	0	—	0	12	6	6
MIDDLE ATLANTIC								
New York:								
Buffalo	58	18	15	—	0	13	36	14
New York	222	188	44	13	8	110	31	136
Rochester	17	7	2	—	0	1	2	4
Syracuse	41	3	2	—	0	0	0	1
New Jersey:								
Camden	11	6	2	—	0	21	6	5
Newark	65	23	3	8	0	3	9	5
Trenton	7	4	0	—	0	0	0	3
Pennsylvania:								
Philadelphia	189	70	21	3	4	19	18	36
Pittsburgh	89	22	14	—	4	13	7	23
Reading	10	2	1	—	0	7	30	2
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	13	13	5	—	2	4	21	11
Cleveland	182	44	14	3	1	3	72	13
Columbus	20	9	1	1	0	1	1	3
Toledo	121	9	7	1	0	1	16	4
Indiana:								
Fort Wayne	6	6	2	—	0	3	0	2
Indianapolis	59	10	14	—	0	1	16	15
South Bend	—	1	—	—	—	—	—	—
Terre Haute	10	1	0	—	0	0	0	1
Illinois:								
Chicago	139	139	107	6	3	8	67	61
Springfield	7	2	0	—	0	1	0	1
Michigan:								
Detroit	130	65	39	8	2	9	11	17
Flint	33	3	4	—	0	5	4	0
Grand Rapids	8	2	0	—	0	0	1	0
Wisconsin:								
Kenosha	43	1	0		0	0	7	0
Madison	86	3	3	—	—	0	17	—
Milwaukee	168	20	7	1	0	6	107	9
Racine	44	2	0	—	0	0	0	1
Superior	5	0	0	—	0	1	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	14	0	0	—	0	0	0	2
Minneapolis	89	23	11	—	1	2	27	10
St. Paul	45	13	0	—	1	0	2	14
Iowa:								
Davenport	4	1	0	—	—	0	0	—
Des Moines	3	3	1	—	—	0	2	—
Sioux City	3	1	1	—	—	0	2	—
Waterloo	23	1	3	—	—	0	0	—
Missouri:								
Kansas City	37	9	8	—	1	0	2	11
St. Joseph	1	2	0	—	0	0	0	0
St. Louis	45	44	19	2	3	553	11	—
North Dakota:								
Fargo	16	0	0	—	0	0	9	1
Grand Forks	0	0	0	—	—	0	4	—
South Dakota:								
Aberdeen	4	0	0	—	—	0	0	—
Sioux Falls	0	0	0	—	—	1	0	—
Nebraska:								
Omaha	27	7	7	—	0	0	9	9
Kansas:								
Topeka	15	2	1	—	1	0	0	3
Wichita	6	3	0	—	0	1	0	1

City reports for week ended December 13, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
SOUTH ATLANTIC								
Delaware:								
Wilmington	4	1	1	------	0	0	0	1
Maryland:								
Baltimore	99	29	9	15	1	1	7	22
Cumberland	0	0	2	------	0	0	0	3
Frederick	1	0	1	------	0	0	1	0
District of Columbia:								
Washington	18	18	17	3	3	3	0	9
Virginia:								
Lynchburg	13	3	1	------	0	0	0	1
Norfolk	28	2	5	------	0	0	0	3
Richmond	2	10	4	------	2	15	0	6
Roanoke	8	3	5	------	1	0	0	2
West Virginia:								
Charleston	3	1	2	1	0	0	7	1
Wheeling	29	2	2	1	0	0	0	2
North Carolina:								
Raleigh	------	1	------	------	------	------	------	------
Wilmington	8	1	1	------	1	0	0	1
Winston-Salem	3	2	0	------	0	0	0	4
South Carolina:								
Charleston	2	1	2	106	1	1	0	3
Columbia	14	0	2	------	1	1	7	0
Greenville	4	0	0	------	0	0	0	0
Georgia:								
Atlanta	3	6	8	19	6	13	0	5
Brunswick	0	0	0	------	0	0	0	1
Savannah	0	2	3	8	1	0	0	4
Florida:								
Miami	1	3	2	------	0	0	0	1
St. Petersburg	------	0	------	------	0	------	------	0
Tampa	0	2	1	------	1	6	0	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	1	1	0	------	1	1	0	1
Tennessee:								
Memphis	79	7	1	------	1	0	6	8
Nashville	3	3	5	------	0	0	1	2
Alabama:								
Birmingham	15	6	11	2	2	49	1	4
Mobile	0	1	1	1	0	0	0	4
Montgomery	8	2	5	3	------	0	0	------
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	------	0	------	------	------	------	------	------
Little Rock	16	0	0	------	------	0	0	1
Louisiana:								
New Orleans	1	13	11	------	0	0	0	20
Shreveport	------	1	------	------	------	------	------	------
Oklahoma:								
Muskogee	0	2	1	------	0	0	0	0
Tulsa	21	5	6	------	------	1	1	------
Texas:								
Dallas	32	16	15	------	1	2	1	6
Fort Worth	5	7	6	------	1	0	0	0
Galveston	0	2	0	------	0	0	0	3
Houston	2	8	7	------	0	0	0	7
San Antonio	1	6	3	------	2	0	0	6
MOUNTAIN								
Montana:								
Billings	4	0	0	------	0	0	0	0
Great Falls	7	1	0	------	0	0	0	0
Helena	8	0	0	------	0	0	0	0
Missoula	0	0	0	------	0	0	0	0
Idaho:								
Boise	1	0	0	------	0	0	0	1
Colorado:								
Denver	31	8	0	------	0	6	3	10
Pueblo	5	1	0	------	0	11	0	1
New Mexico:								
Albuquerque	12	1	0	------	0	2	0	0
Arizona:								
Phoenix	1	0	0	------	0	0	0	6

City reports for week ended December 13, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MOUNTAIN—con.								
Utah:								
Salt Lake City	3	4	2		1	0	0	5
Nevada:								
Reno	0	0	1		0	0	0	1
PACIFIC								
Washington:								
Seattle	11	5	5			0	24	
Spokane	0	2	0			4	0	
Tacoma	13	3	6		0	0	0	1
Oregon:								
Portland	20	11	1		0	2	20	9
Salem	1	0	0		0	0	6	0
California:								
Los Angeles	29	18	9	31	2	4	10	17
Sacramento	16	2	1		0	3	8	6
San Francisco	43	16	6		1	2	6	0

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	2	4	0	0	0	0	0	1	0	32	24
New Hampshire:											
Concord	0	0	0	0	0	2	0	0	0	0	12
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	1	3
Burlington	1	0	0	0	0	0	0	0	0	0	7
Massachusetts:											
Boston	68	49	0	0	0	4	1	5	1	41	212
Fall River	5	2	0	0	0	1	0	0	0	1	19
Springfield	7	6	0	0	0	1	0	0	0	3	31
Worcester	10	11	0	0	0	2	0	0	0	1	51
Rhode Island:											
Pawtucket	2	4	0	0	0	0	0	0	0	1	25
Providence	8	12	0	0	0	1	0	0	0	12	52
Connecticut:											
Bridgeport	8	3	0	0	0	0	0	0	0	0	30
Hartford	6	15	0	0	0	1	0	2	0	0	29
New Haven	4	1	0	0	0	0	0	0	0	0	29
MIDDLE ATLANTIC											
New York:											
Buffalo	26	26	1	0	0	6	0	0	1	21	113
New York	169	136	0	0	0	97	11	12	0	149	1,422
Rochester	6	48	0	0	0	2	1	2	1	9	51
Syracuse	11	12	0	0	0	1	0	0	0	7	42
New Jersey:											
Camden	4	2	0	0	0	0	0	0	0	2	28
Newark	16	15	0	0	0	8	1	0	0	51	100
Trenton	4	16	0	0	0	2	0	0	0	1	41
Pennsylvania:											
Philadelphia	75	108	0	0	0	22	8	0	0	20	461
Pittsburgh	34	47	0	0	0	11	1	0	0	4	198
Reading	2	1	0	0	0	2	0	0	0	0	28
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	15	35	0	0	0	7	1	0	0	4	124
Cleveland	35	82	0	0	0	13	1	0	1	40	174
Columbus	12	14	1	0	0	4	0	2	1	1	86
Toledo	12	8	0	7	0	4	1	0	0	2	71

City reports for week ended December 13, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
EAST NORTH CENTRAL—con.											
Indiana:											
Fort Wayne	4	3	1	0	0	1	0	2	0	0	16
Indianapolis	11	38	4	2	0	5	0	0	0	6	-------
South Bend	3	------	0	------	------	------	0	------	------	------	-------
Terre Haute	3	3	1	0	0	0	0	0	0	0	15
Illinois:											
Chicago	112	207	3	1	0	34	2	6	2	41	708
Springfield	2	4	0	0	0	1	0	0	0	0	15
Michigan:											
Detroit	91	69	0	0	0	20	2	0	0	47	258
Flint	13	10	1	0	0	0	0	0	0	3	17
Grand Rapids	10	12	0	1	0	2	0	0	0	5	38
Wisconsin:											
Kenosha	1	2	1	0	0	0	0	0	0	0	9
Madison	2	2	0	0	------		0	0		1	------
Milwaukee	24	16	0	0	0	8	0	1	0	16	107
Racine	5	2	0	0	0	1	0	0	0	6	15
Superior	3	6	0	0	0	0	0	0	0	0	5
WEST NORTH CENTRAL											
Minnesota:											
Duluth	10	0	0	0	0	1	0	0	0	1	28
Minneapolis	47	12	1	0	0	2	0	1	0	17	120
St. Paul	25	6	2	1	0	4	1	0	0	19	68
Iowa:											
Davenport	1	1	0	5	------	------	0	0	-------	0	-------
Des Moines	11	11	0	6	-------	-------	0	0	-------	0	29
Sioux City	2	9	0	0	-------	-------	0	0	-------	1	-------
Waterloo	3	0	0	1	-------	-------	0	0	-------	0	-------
Missouri:											
Kansas City	15	10	1	1	0	5	0	0	0	2	97
St. Joseph	2	3	0	0	0	0	0	0	0	0	26
St. Louis	31	41	0	0	0	8	1	2	0	11	212
North Dakota:											
Fargo	3	1	0	0	0	0		0	0	1	7
Grand Forks	0	1	0	0	-------	-------	0	0	-------	0	-------
South Dakota:											
Aberdeen	1	0	1	0	-------	-------	0	0	-------	0	-------
Sioux Falls	1	0	1	1	-------	-------	0	0	-------	0	9
Nebraska:											
Omaha	5	22	2	53	0	3	0	0	0	2	68
Kansas:											
Topeka	2	0	1	0	0	0	0	0	0	0	22
Wichita	4	4	0	7	0	0	0	0	1	3	21
SOUTH ATLANTIC											
Delaware:											
Wilmington	3	7	0	0	0	2	0	0	0	0	30
Maryland:											
Baltimore	26	32	0	0	0	12	2	0	0	12	189
Cumberland	1	10	0	0	0	0	0	0	0	0	12
Frederick	1	0	0	0	0	0	0	0	0	0	4
District of Columbia:											
Washington	21	29	0	0	0	9	1	0	0	4	133
Virginia:											
Lynchburg	0	8	0	0	0	1	0	1	1	0	11
Norfolk	3	1	0	0	0	1	0	0	0	0	-------
Richmond	7	17	0	0	0	3	0	1	0	4	54
Roanoke	8	4	0	0	0	0	0	0	0	0	18
West Virginia:											
Charleston	2	1	0	0	0	0	0	0	0	0	11
Wheeling	2	2	0	0	0	0	0	0	0	0	16
North Carolina:											
Raleigh	2	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Wilmington	1	0	1	0	0	0	0	0	0	0	12
Winston-Salem	8	1	-------	0	0	0	0	0	0	0	17
South Carolina:											
Charleston	1	0	0	0	0	1	0	0	0	0	30
Columbia	1	4	0	0	0	3	0	0	0	0	34
Greenville	0	0	1	0	0	0	0	0	0	0	-------

City reports for week ended December 13, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
SOUTH ATLANTIC—continued											
Georgia:											
Atlanta	6	17	0	0	0	5	0	0	1	0	86
Brunswick	0	0	0	0	0	0	0	0	0	0	5
Savannah	0	2	0	0	0	4	1	0	1	0	-------
Florida:											
Miami	4	3	0	0	0	1	0	0	0	5	28
St. Petersburg	0	-------	0	-------	0	2	0	-------	0	-------	13
Tampa	1	1	0	0	0	0	0	0	0	0	25
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	8	0	0	0	1	0	0	0	0	16
Tennessee:											
Memphis	6	28	0	0	0	4	1	0	0	0	72
Nashville	3	9	0	0	0	3	1	2	0	0	42
Alabama:											
Birmingham	4	15	0	0	0	4	1	1	0	0	46
Mobile	0	1	1	0	0	2	0	0	0	0	29
Montgomery	1	2	0	0	-------	-------	0	0	-------	3	-------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Little Rock	2	2	0	0	0	0	1	0	0	0	-------
Louisiana:											
New Orleans	8	7	0	0	0	7	2	2	2	6	152
Shreveport	2	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Oklahoma:											
Muskogee	1	1	0	0	-------	-------	0	1	-------	0	-------
Tulsa	3	8	0	2	-------	-------	0	0	-------	0	-------
Texas:											
Dallas	7	11	0	1	0	2	0	2	1	5	53
Fort Worth	4	5	1	0	0	4	0	0	1	0	33
Galveston	0	1	0	0	0	0	0	1	0	0	13
Houston	3	2	1	1	0	1	0	1	0	0	77
San Antonio	3	0	0	0	0	9	0	0	0	0	68
MOUNTAIN											
Montana:											
Billings	1	0	1	17	0	0	0	0	0	3	6
Great Falls	4	4	1	0	0	0	0	0	0	4	8
Helena	0	0	0	0	0	0	0	0	0	0	6
Missoula	0	0	0	0	0	0	0	0	0	15	7
Idaho:											
Boise	1	0	0	0	0	0	0	0	0	5	7
Colorado:											
Denver	13	20	0	0	0	9	1	0	0	7	99
Pueblo	1	0	0	0	0	1	0	0	0	3	12
New Mexico:											
Albuquerque	1	0	0	0	0	3	0	0	0	0	10
Arizona:											
Phoenix	2	0	0	0	0	1	1	0	0	0	14
Utah:											
Salt Lake City	4	0	1	0	0	1	1	0	0	11	40
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	3
PACIFIC											
Washington:											
Seattle	9	8	1	0	-------	-------	1	2	-------	16	-------
Spokane	8	5	4	0	-------	-------	0	0	-------	0	-------
Tacoma	5	2	3	8	0	0	0	0	0	2	[illegible]
Oregon:											
Portland	7	3	6	2	0	1	0	0	0	1	66
Salem	0	2	0	0	0	0	0	0	0	1	-------
California:											
Los Angeles	32	9	1	0	0	18	1	1	0	10	258
Sacramento	3	1	1	0	0	6	0	0	0	3	25
San Francisco	16	10	1	0	0	9	0	0	0	26	145

City reports for week ended December 13, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	1	0
Massachusetts:									
Boston	0	0	0	0	1	0	1	3	0
Worcester	0	0	0	0	0	0	0	1	0
Connecticut:									
Hartford	1	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
New York	13	9	2	2	0	0	1	[illegible]	0
Pennsylvania									
Philadelphia	0	0	0	0	0	0	0	1	0
Pittsburgh	1	1	0	0	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	2	1	0	0	0	0	[illegible]	0
Cleveland	1	0	0	0	0	0	0	2	0
Columbus	0	1	0	0	0	0	0	0	0
Indiana									
Indianapolis	2	2	0	0	0	0	0	0	0
Illinois									
Chicago	8	5	1	0	0	0	0	3	1
Springfield	0	0	0	0	0	0	0	1	0
Michigan.									
Detroit	2	1	0	0	0	0	0	2	0
Flint	1	1	0	0	1	0	0	0	0
Grand Rapids	0	0	0	1	0	0	0	0	0
Wisconsin.									
Madison	1	-------	0	-------	0	-------	0	0	-------
Milwaukee	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL									
Missouri:									
Kansas City	0	0	0	0	0	1	0	0	0
St. Louis	3	0	1	1	0	0	0	[illegible]	0
South Dakota:									
Sioux Falls	1	0	0	0	0	0	0	[illegible]	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	1	1	1	0	1	0	0	[illegible]	0
Virginia:									
Richmond	0	1	0	0	0	0	0	[illegible]	0
South Carolina:									
Charleston	0	0	0	0	0	0	0	[illegible]	0
Georgia:									
Atlanta [1]	3	2	0	0	0	0	0	0	0
Savannah [1]	0	0	0	0	2	2	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	2	0	0	0	0	0	0	0	0
Nashville	1	1	0	0	0	0	0	0	0
Alabama:									
Birmingham	2	0	1	0	1	0	0	0	0
Mobile	0	0	0	0	0	2	0	0	0
Montgomery	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	1	0	0	0
Louisiana:									
New Orleans	3	3	0	0	0	0	0	0	0
Texas:									
Dallas	0	0	0	0	2	2	0	0	0
Fort Worth	0	0	0	0	0	0	0	1	0
Galveston	0	0	0	0	0	0	0	1	0

[1] Typhus fever: 7 cases and 1 death; 1 case at Atlanta, Ga.; 5 cases and 1 death at Savannah, Ga.; and 1 case at Los Angeles, Calif.

City reports for week ended December 13, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
MOUNTAIN									
Colorado:									
Denver	1	1	0	0	0	0	0	1	0
Arizona									
Phoenix	2	0	0	0	0	0	0	0	0
Utah:									
Salt Lake City	1	0	0	0	0	0	0	0	0
PACIFIC									
Oregon									
Portland	0	0	1	0	0	0	0	0	0
California									
Los Angeles [1]	1	1	0	0	1	1	0	1	0
Sacramento	0	0	0	0	0	0	0	1	0
San Francisco	0	1	0	0	0	0	0	0	0

[1] Typhus fever: 7 cases and 1 death; 1 case at Atlanta, Ga.; 5 cases and 1 death at Savannah, Ga.; and 1 case at Los Angeles, Calif.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended December 13, 1930, compared with those for a like period ended December 14, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities November 9 to December 13, 1930.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929
98 cities	91	159	102	[2] 186	89	139	[3] 92	146	[4] 90	134
New England	75	168	113	117	80	177	111	112	117	117
Middle Atlantic	46	112	54	123	50	123	61	110	50	112
East North Central	130	205	125	302	123	167	113	191	[5] 122	170
West North Central	104	165	108	169	108	114	99	121	95	148
South Atlantic	110	122	141	135	60	144	[6] 104	127	[6] 113	107
East South Central	209	232	310	239	155	157	162	226	155	137
West South Central	172	427	183	446	164	259	[7] 159	362	[8] 147	293
Mountain	26	44	26	[2] 89	77	17	[9] 0	157	26	61
Pacific	73	84	73	60	111	56	76	84	64	58

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930, and 1929, respectively.
[2] Reno, Nev., not included.
[3] Raleigh, N. C., Shreveport, La., and Denver, Colo., not included.
[4] South Bend, Ind., Raleigh, N. C., Fort Smith, Ark., and Shreveport, La., not included.
[5] South Bend, Ind., not included.
[6] Raleigh, N. C., not included.
[7] Shreveport, La., not included.
[8] Fort Smith, Ark., and Shreveport, La., not included.
[9] Denver, Colo., not included.

Summary of weekly reports from cities November 9 to December 13, 1930.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

MEASLES CASE RATES

	Week ended—									
	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov 23, 1929	Nov. 29, 1930	Nov 30, 1929	Dec. 6, 1930	Dec 7, 1929	Dec 13, 1930	Dec. 14, 1929
98 cities	93	56	120	[1] 72	109	74	[2] 146	98	[4] 167	113
New England	157	45	164	56	148	70	202	81	250	85
Middle Atlantic	71	26	80	34	73	33	89	54	89	47
East North Central	17	91	31	94	28	101	28	93	[5] 27	133
West North Central	491	50	751	81	636	100	933	216	1,055	202
South Atlantic	24	7	59	24	40	22	[6] 57	4	[6] 74	28
East South Central	20	14	169	14	74	0	175	14	337	14
West South Central	0	19	4	27	11	38	[7] 12	46	[8] 8	61
Mountain	300	252	318	[1] 107	275	131	[9] 51	165	146	104
Pacific	38	142	33	280	12	249	31	377	31	464

SCARLET FEVER CASE RATES

	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov 23, 1929	Nov. 29, 1930	Nov 30, 1929	Dec. 6, 1930	Dec 7, 1929	Dec 13, 1930	Dec. 14, 1929
98 cities	191	205	200	[1] 218	178	212	[2] 207	252	[4] 229	277
New England	253	265	217	249	241	258	246	276	237	375
Middle Atlantic	133	135	168	127	156	116	187	148	196	172
East North Central	290	511	266	347	224	361	279	409	[5] 318	438
West North Central	140	139	214	223	137	183	194	231	205	271
South Atlantic	141	238	198	163	172	139	[6] 211	159	[6] 241	193
East South Central	310	157	236	157	243	137	337	144	425	89
West South Central	127	152	101	156	142	118	[7] 100	156	[8] 94	137
Mountain	378	226	275	[1] 267	223	348	[9] 120	392	206	322
Pacific	116	179	102	261	97	266	113	355	83	340

SMALLPOX CASE RATES

	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov 23, 1929	Nov. 29, 1930	Nov 30, 1929	Dec. 6, 1930	Dec 7, 1929	Dec 13, 1930	Dec. 14, 1929
98 cities	4	13	3	[1] 24	8	14	[2] 7	19	[4] 15	23
New England	0	25	0	0	0	0	0	0	0	2
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	2	22	0	33	4	13	1	26	[5] 3	29
West North Central	21	42	33	50	66	48	47	64	120	56
South Atlantic	0	0	0	2	0	0	[6] 0	0	[6] 0	0
East South Central	0	0	0	0	0	0	0	0	0	0
West South Central	4	4	4	38	4	11	[7] 4	19	[8] 8	34
Mountain	0	9	43	[1] 71	34	35	[9] 205	78	146	78
Pacific	21	31	7	111	9	75	12	60	7	118

TYPHOID FEVER CASE RATES

	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov 23, 1929	Nov. 29, 1930	Nov 30, 1929	Dec. 6, 1930	Dec 7, 1929	Dec 13, 1930	Dec. 14, 1929
98 cities	15	8	15	[1] 13	10	5	[2] 10	7	[4] 8	6
New England	22	22	15	11	11	2	7	2	18	7
Middle Atlantic	4	3	5	10	3	2	8	4	7	6
East North Central	5	6	9	9	4	5	10	4	[5] 7	3
West North Central	19	4	23	12	8	6	6	2	6	6
South Atlantic	31	9	26	19	29	4	17	6	[6] 4	7
East South Central	54	14	13	34	13	34	13	48	20	14
West South Central	93	8	90	34	75	15	28	0	[8] 25	8
Mountain	26	44	51	[1] 36	9	26	[9] 17	26	0	9
Pacific	12	10	12	5	7	2	12	10	7	7

[1] Reno, Nev., not included.
[2] Raleigh, N. C., Shreveport, La., and Denver, Colo., not included.
[4] South Bend, Ind., Raleigh, N. C., Fort Smith, Ark., and Shreveport, La., not included.
[5] South Bend, Ind., not included.
[6] Raleigh, N. C., not included.
[7] Shreveport, La., not included.
[8] Fort Smith, Ark., and Shreveport, La., not included.
[9] Denver, Colo., not included.

Summary of weekly reports from cities November 9 to December 13, 1930.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

INFLUENZA DEATH RATES

	Week ended—									
	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929
91 cities	10	9	11	[3] 8	9	11	[4] 10	17	[10] 10	16
New England	4	9	7	4	2	4	4	11	4	7
Middle Atlantic	9	4	8	9	11	5	6	14	8	9
East North Central	9	9	5	6	7	10	8	9	[5] 5	15
West North Central	6	3	6	9	0	21	12	27	21	12
South Atlantic	5	11	22	4	9	17	[6] 19	28	[6] 22	19
East South Central	44	22	15	30	29	15	15	60	29	60
West South Central	31	31	38	16	15	55	[7] 37	47	[7] 12	78
Mountain	9	26	60	[3] 9	26	17	[8] 34	17	9	0
Pacific	6	9	9	6	9	13	3	13	9	19

PNEUMONIA DEATH RATES

	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929
91 cities	118	98	119	[3] 101	112	106	[4] 102	136	[10] 108	150
New England	104	88	115	88	71	92	66	74	109	135
Middle Atlantic	136	103	140	106	125	101	107	139	109	156
East North Central	86	71	83	96	78	84	78	126	[5] 85	116
West North Central	77	120	136	102	92	126	130	126	145	174
South Atlantic	157	107	143	94	165	129	[6] 143	131	[6] 121	191
East South Central	214	231	199	254	155	224	177	239	140	216
West South Central	111	121	123	129	165	156	[7] 139	238	[7] 176	230
Mountain	215	157	163	[3] 107	223	157	[8] 137	165	154	102
Pacific	83	85	61	28	86	104	74	138	74	107

[3] Reno, Nev., not included.
[4] Raleigh, N. C., Shreveport, La., and Denver, Colo., not included.
[5] South Bend, Ind., not included.
[6] Raleigh, N. C., not included.
[7] Shreveport, La., not included.
[8] Denver, Colo., not included.
[10] South Bend, Ind., Raleigh, N. C., and Shreveport, La., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended December 13, 1930.—The Department of Pensions and National Health reports cases of certain communicable diseases in Canada for the week ended December 13, 1930, as follows:

Province	Cerebrospinal fever	Dysentery	Influenza	Poliomyelitis	Typhoid fever
Prince Edward Island [1]					
Nova Scotia			4		
New Brunswick					7
Quebec			2		17
Ontario			1	1	2
Manitoba					1
Saskatchewan	1				
Alberta					1
British Columbia	1	6			4
Total	2	6	7	1	32

[1] No case of any disease included in the table was reported during the week

Quebec Province—Communicable diseases—Week ended December 13, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended December 13, 1930, as follows:

Disease	Cases	Disease	Cases
Chicken pox	122	Paratyphoid fever	4
Diphtheria	44	Scarlet fever	96
Erysipelas	5	Smallpox	1
German measles	1	Tuberculosis	44
Influenza	2	Typhoid fever	17
Measles	80	Whooping cough	33
Mumps	27		

CZECHOSLOVAKIA

Communicable diseases—October, 1930.—During the month of October, 1930, certain communicable diseases were reported in the Republic of Czechoslovakia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	9		Paratyphoid fever	18	1
Cerebrospinal meningitis	10	7	Puerperal fever	40	20
Diphtheria	2,877	160	Scarlet fever	2,617	41
Dysentery	135	15	Trachoma	218	
Malaria	10		Typhoid fever	671	49

LATVIA

Communicable diseases—October, 1930.—During the month of October, 1930, cases of certain communicable diseases were reported in the Republic of Latvia, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	3	Poliomyelitis	11
Diphtheria	91	Puerperal fever	9
Erysipelas	58	Scarlet fever	134
Influenza	177	Tetanus	1
Leprosy	4	Trachoma	125
Measles	80	Typhoid fever	108
Mumps	27	Whooping cough	42

VIRGIN ISLANDS

Communicable diseases—November, 1930.—During the month of November, 1930, cases of certain communicable diseases were reported in the Virgin Islands as follows:

St. Thomas and St. John:	Cases
Dysentery	2
Chancroid	1
Gonorrhea	3
Syphilis	18
Tuberculosis	1

St. Croix:	Cases
Gonorrhea	1
Syphilis	2

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug 23, 1930	Aug. 24-Sept 20, 1930	Week ended— Sept. 27, 1930	October, 1930: 4	October, 1930: 11	October, 1930: 18	October, 1930: 25	November, 1930: 1	November, 1930: 8	November, 1930: 15	November, 1930: 22	November, 1930: 29	December, 1930: 6	December, 1930: 13
Afghanistan	C		P[1]	P													
China:																	
Amoy	C				2												
	D				2												
Canton	C	2	2				1			1							
	D		1														
Shanghai	C				31	23	5	6	4	1		1					
	D				3	2			2								
Shensi Province	C				P												
Swatow	C	7		3	2												
Tientsin	C			2	1												
India	C	37,102	26,121	42,893	51,551	11,109	10,172	7,863									
	D	25,711	13,922	22,358	23,959	5,225	4,808	3,928									
Bassein	C				1												
Bombay	C			14	1	1	3	1	11	17	1	1		2	2		
	D			8	2	1	2		8	10	6	1		2	1		
Calcutta	C	327	220	63	27	4	4	7	9	7	7	11		4			
	D	179	128	30	12	3	4	4	4	4	2	6		4			
Madras	C			1				2			1						
	D			1				2									
Negapatam	C	1															
	D	1															
Rangoon	C	6	1	1	2			1									
	D	4	1	1	1			1									
Tuticorin	C								1				1	4			
	D								1				1				

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug 23, 1930	Aug. 24-Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22	29	December, 1930: 6	13
India (French):																	
Chandernagor	C	3	1		1		1	2							P		
	D	2					1										
Karikal	C	3															
	D	3															
Pondicherry	C							1						1	1		
	D							1						1	1		
India (Portuguese)	C			1	1						3						
	D				1						3						
Indo-China (see also table below):																	
Pnompenh	C	40	32	11		1		1		1					1	1	
	D	18	22	6											1	1	
Saigon and Cholon	C	48	10	5		1	1			1					1		
	D	23	3	1											1		
Philippine Islands: [2]																	
Ports—																	
Cebu	C	1	65	9	2												
	D		36	8	2												
Iloilo	C		29	64	10	1									1		
	D		22	56	14	2			2						3		
Manila	C			1	43	2	1	2									
	D				12		1										
Provinces—																	
Antique	C			20	47	12		28									
	D			12	34	8		10									
Bohol	C			178	49												
	D			79	20												
Bulacan	C	3	4	1	4		2										
	D	1			2		1										
Capiz	C		3	2	1												
	D		2	2													
Cebu	C	355	713	85	25												
	D	170	303	50	11												

[2] Figures for cholera in the Philippine Islands are subject to correction

Iloilo	C	2	309	571	238	18	7	13	12	10	10	4	6	11	21	13	
	D	1	193	376	151	15	6	7	12	7	7	3	6	8	11	8	
La Union	C		1														
Leyte	C	47	1														
	D	19	11														
Masbate	C	10	92	34													
	D	3	35	14													
Misamis, Occidental	C		3														
	D		3														
Negros, Occidental	C	140	568	343	122	8	10	5	5	12	3	19	22	44	38	48	33
	D	88	368	237	91	6	5	6	3	12	3	12	14	33	17	45	28
Negros, Oriental	C		23	8													
	D		13	4													
Nueva Ecija	C		1														
	D		1														
Pampanga	C	2	2		1												
Pangasinan	C		3	1													
	D		2	1													
Rizal	C	1	1														
	D											4					
Samar	C			18	4	4			3	6	3	4	3	4	4		
	D			16	2	4			3	5	1	4	2	4	4		
Sorsogon	C											5					
	D	1	1									4					
Surigao	C			28	1	(1)											
	D			17	2												
Tarlac	C			1													
Siam	C	27	20	3				1	3	3		1			1	1	
	D	19	9	2					1	3		1					
Bangkok	C	12	8	1				1	2	1	2			2	1		
	D	5	3	1				1	1	1	1			2	1		
Songkla	C		10														
	D		6														
On vessel:																	
S. S. Malwa from Shanghai	D				1												
On small boat at Port Cebu, from Bantayan Island	C	1															
	D	1															

Place		May, 1930	June, 1930	July, 1930	August, 1930			September, 1930			October, 1930			November, 1930	
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Indo-China (French) (see also table above):															
Annam [2]	C	23	16	1		3									
Cambodia [2]	C	88	144	43	37	22		23	13	2	16		6		1
Cochin-China [2]	C	671	273	46	22	5		9	6	18	14	6	8		5

[1] During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, P. I.

[2] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Aug. 24-Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930 4	11	18	25	November, 1930 1	8	15	22	29	December, 1930 6	13
Algeria:																	
Algiers	C		3	7	11	1	1	2	2	5	3	1	2			1	
	D									3							
Constantine	C	1	1									1					
Oran	C		3	4	10		4	4	2	1			1				
	D				1			2	1								
Plague-infected rats			2		10	2			4	1							
Philippeville	C				1	1		1	1	1		1					
Argentina: Cordoba Province—Chazon	C																1
Belgian Congo	C		2	2	5								1				
	D		2	2	3								1				
British East Africa (see also table below): Uganda	C	406	228	236	202	65	18	32	50	53							
	D	328	213	229	191	65	18	32	49	53							
Canary Islands: Las Palmas	D			1													
Ceylon:																	
Colombo	C	1	3	2	2	1	1		1				1	1			
	D	1	3	2	3	1	1		1				1	1			
Plague-infected rats		1	1										1	1	1		
China:																	
Manchuria—Tungliau and Nungan	C			30	29	2											
Shensi	C				P					P							
Dutch East Indies:																	
Batavia and West Java	C	98	84	83	79	22	14	26	45	41	36						
	D	96	84	83	76	22	14	26	41	42	37						
Plague-infected rats		4		1	3												
Java and Madura	D	202	217	188	260	75	68	95	97	124	140						
Ecuador (see table below).																	
Egypt:																	
Alexandria	C	19	23	11	10	2	1	3	3	2	1	1	3		1		2
	D	9	10	6	8	3	1	1	1	3		2	2				1
Assiout	C	9	2									3			2		7
	D	3	2									1					1
Aswan	C														3		
Beni-Suef	C			1													

Dakahlieh	C	1															
Gharbieh	C			3													
	D			1													
Girga	C		1		1												
Minieh	C	10	3														1
	D	1															
Port Said	C	2	1	1						1	1						
France:																	
Marseille	C				5				4	2	1		1				
St. Ouen	C		1														
	D		1														
Gambia	C			4													
	D			4													
Greece (see also table below):																	
Patras	C	1	1														
Pyrgos	C						2										
Hawaii Territory, Hamakua, Hawaii: Plague-infected rats		1															
India	C	240	377	877	2, 497	672	527	627									
	D	187	256	477	1, 132	259	222	269									
Bassein	C				2						1						
	D				3												
Bombay	C	3	1		1	1			1	1							
	D	2	1		1		1		1		1						
Plague-infected rats		27	52	35	47	21	13	16	14	2	9	11	8	11	5		
Madras Presidency	C	39	47	81	127	41	59	46	50	69	31						
	D	22	31	34	57	14	32	31	33	43	22						
Rangoon	C	1	2	3	10	2					1		1				
	D	1	2	2	9	2					1						
Plague-infected rats		1	6	7	8		1			1				1	1		
India (Portuguese)	D			P							3						
Indo-China (see also table below):																	
Pnompenh	C	6	2	4	3	1	1							1	3	1	
	D	7	2			1	1	1		1				1	3	1	
Saigon and Cholon	C	2		1	1	1											
	D	1															
Iraq: Baghdad	C	28	18	9		1							P				
	D	15	7	3		1											
Kwang-Chow-Wan	C	31	4	1													
Madagascar (see also table below): Tamatave	C	1	1	2	1		1			3		2			2		
	D						1			3					2		
Morocco	C	3	1	15						4		1					
	D	4		2													
Nigeria: Lagos	C	5	1	7	6		3		2	33	1	2	2	4	3		
	D	5	1	7	6		3		2		1	2	2	4	3		
Plague-infected rats		11	18	8	10				11	3	1	2					
Senegal (see table below).																	
Siam	C			7	3			1		3	1	1					
	D			6	2					3	1						
Bangkok	C			3													
	D			2													
Nagara Rajsima	C			2	1				1				1				
	D			2	1				1				1				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Aug. 24-Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22	29	December, 1930: 6	13
Syria: Beirut	C	12	9	2	5					1	1	3	1				
Tripolitania	C			2										4	6		
Tunisia:																	
Sfax district	C	9	6	1													
Tunis	C	1	5								1		1				P
	D	1	1														
Union of Socialist Soviet Republics:																	
Salsk Region	C	2	5	7													
	D	1	4	5													
Stavropol Region	C	1															
	D	1															
Union of South Africa:																	
Cape Province	C	1	1	1	1					1							
	D		1	1	1												
Orange Free State	C				2												
	D				2												

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
British East Africa (see also table above):							
Kenya	C	171	107	97	87	53	50
Ecuador: Guayaquil	C	0	0				
	D	0	0				
Plague-infected rats		0	0				
Greece (see also table above)	C		1				
Indo-China (see also table above)	C		11	1	2	4	
Madagascar (see also table above).							
Ambositra Province	C	1					
	D	1					
Antsirabe Province	C	19	3	24	11	21	
	D	19	3	24	11	21	
Miarinarivo Province	C	5	1	1	2	7	
	D	5	1	1	2	7	
Moramanga Province	C	1	3		27	18	
	D		3		27	17	

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
Madagascar (see also table above)—Con.							
Tananarive Province	C	15	16	28	39	79	
	D	14	16	28	38	79	
Senegal.							
Baol [1]	C	13	2	62	79	48	53
	D	11	2	48	20	23	35
Dakar [1]	C	52	53	140	108	3	
	D	42	117	122	90	8	
Louga [1]	C	54	60	138	75	61	37
	D	27	21	103	33	30	25
Thies [1]	C	21	52	54	34	12	24
	D	8	85	30	20	4	15
Tivaouane [1]	C	135	43	119	110	20	53
	D	69	28	70	54	14	31

[1] Reports incomplete.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Aug. 24-Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22	29	December, 1930: 6	13
Algeria:																	
Algiers	C		1	3													
Constantine	C	1	1									1					
Arabia: Aden	C		1														
Brazil. Rio de Janeiro	C											2					
British East Africa (see also table below):																	
Tanganyika	C	1,610	169	242	522	27	43	4	21	3	1						
	D	301	42	37	60	1		1	4	1							
British South Africa: Southern Rhodesia	C	79	31	1	1	14	39	98	2	2	54						
Canada:																	
Alberta	C		5	1	1		13	8	1					1			
British Columbia—Vancouver	C	2	6	6	2	1			1		3					1	
Manitoba	C	4			1												
Ontario	C	47	24	20	10	1		3	15		20	9		7	12	3	
Ottawa	C	15	13	7	5					14		9	14		8	1	1
Toronto	C	4	1		1										2	2	
Quebec	C	4	3	5										1			1
Montreal	C			7													
Saskatchewan	C	22	5	8	1		3				2			2		16	
China.																	
Changking	C	1	P	P	P	P	P	P	P	P	P	P					
Foochow	C	P	P	P	P		P				P		P				
Hong Kong	C	4	2														
	D	3	1														
Manchuria—																	
Harbin	C	4	3	2													
Kwantung—Dairen	C	16	8											1			
	D	1															
Nanking	C	P	P	P	P	P	P	P	P	P	P	P					
Shanghai—																	
Foreigners only	C	5	4	3	18				1	1		1					
Including natives	D	3			2								1				
Swatow	D	4	1	4	2	1			3	1	1		1	1			
Tientsin	C					1											
Chosen (see table below).																	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		June 1–28, 1930	June 29–July 26, 1930	July 27–Aug. 23, 1930	Aug. 24–Sept 20, 1930	Week ended— Sept. 27, 1930	October, 1930 4	October, 1930 11	October, 1930 18	October, 1930 25	November, 1930 1	November, 1930 8	November, 1930 15	November, 1930 22	November, 1930 29	December, 1930 6	December, 1930 13
Colombia:																	
Barranquilla	C			2													
Buenaventura	C	6	10	2													
Cali	D						1		1								
Costa Rica: Port Limon	C	2															
Curacao (alastrim)	C	1	2	1													
Dutch East Indies:																	
Borneo	C	12	2														
	D	1															
Java—																	
Batavia and West Java	C	13	8	12	11	10	2	1	1	2	13						
	D	3	5	5	4	1	1	1	1	2	1						
East Java and Madura	C		1														
Sanggi Islands	C		11	36	14					29							
	D		3	2	3					3							
Egypt: Port Said	C		8														
France (see table below).																	
Great Britain:																	
England and Wales	C	926	529	344	341	82	74	44	125	86	87	92	107	116	160	95	
Ashton under Lyne	C	7	8														
Bradford	C		1				1	1	1	1	1						
Cardiff	C		2							1							
Leeds	C		1							1			2				
London	C	498	250	178	164	30	34	23	33	29	32	41	47	52	67	27	
London and Great Towns	C	753	408	285	265	55	56	32	80	52	58	68	82	88	136	74	
	D							1			1						
Stoke-on-Trent	C	32	9	2	2			1			1						
Scotland	C	4	1		5												
	D		1														
Honduras: Naco	C				5												
India	C	12,962	7,630	4,877	3,131	611	528	567									
	D	3,531	2,348	1,246	680	202	122	113									
Bombay	C	113	50	12	6			1									
	D	79	33	10	5												

Calcutta	C	131	73	25	14	3	4	3	2	2	4	3		3			
	D	146	56	21	9	3	4	3	1	2	2	3		3			
Cochin	C	16	6	14	3			8	4	3	5	10	7	4	5		
	D	4			1			1		1			2	2			
Karachi	C	7	1	4	4									2			
	D	3		3	2										1		
Madras	C	35	49	38	34	4	4	8	3	2	1	2	4	3	5		
	D	10	12	11	6	1	2	3	2			2					
Moulmein	C	21	18	2	1												
	D	7	1	1	1												
Negapatam	C	2	4	4	9	4	2	5	3	2	2	2	3	3			
Rangoon	C	9		3					2			5			1		
	D	2															
Tuticorin	C	1							1								
Vizagapatam	C	1						1									
India (French):																	
Chandernagor	C	19	4		3			3			3						
	D	3	3		2			1			1						
Karikal	C	11	2	9	5	1											
	D	8	2	9	2	1											
Pondicherry Province	C	23	26	22	35	11	10	6	11	2	2						
	D	23	25	22	33	11	8	6	11	2	2						
India (Portuguese)	C	28	1	9	4												
	D	10	1	2													
Indo-China (see also table below):																	
Pnompenh	C		1					2							1		
	D	1	1	1											1		
Saigon and Cholon	C	1		1	1						2			2	1		
	D			3	1						2			1			
Iraq:																	
Baghdad	C	1	3	1	1		2										
	D		1	1													
Mossoul Liwa	C	4	67			63		4	2			6		7	9		
	D	1	20			27								1	1		
Ivory Coast (see table below).																	
Mexico (see also table below):																	
Jalisco (State) Guadalajara	D	15	4	1			2		1	1		1	1	1		2	
Juarez	C	6		2													
	D	1		1		1				1							
Mexico City and surrounding territory	C	77	37	10	12	1	3	5	4	1	3		2	1	2		
	D	17	8	6	5			1	2	1							
Progreso	D	1															
Vera Cruz	C										1						
Morocco (see table below).																	
Nigeria: Lagos	C	1															
Poland	C	2								2	3			1	2		
Portugal:																	
Lisbon	C	10	13	50	27	4	5		7	12			8	11			
Oporto	C			1													
Siam	C		6				1										
	D		3														

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Aug. 24-Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22	29	December, 1930: 6	13
Somaliland, British: Boales	C						1					1					
	D						1										
Spain	C	12	5	2	5					14	5	11	21	23			
Straits Settlements	C	9	11	8	6	1	1	1	2	3	3	4		3	9		
	D	2	3	3	1			1			1	1		1	2		
Sudan (Anglo-Egyptian)	C	67	12	42	128	25	1	56		3			2		3		47
	D	3	1	3	52	2		5					1				
Sudan (French) (see table below).																	
Switzerland: Berne Canton	C		1	2		1											
Syria (see table below).																	
Tunisia: Tunis	C	2	1			2											
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C		P		P			P	P	P	P	P					
Orange Free State	C		P	P							1	1					
Transvaal	C			P	P	P		P	P	P	P	P					
Upper Volta	C	13															
On vessel: S. S. Manoa, from Honolulu to San Francisco	C		1														

Place		May, 1930	June 1930	July, 1930	August, 1930			September, 1930			October, 1930		
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31
Indo-China (see also table above)	C	305	213	238	59	34		54	52	86	82	62	164
Ivory Coast	C												4
Sudan (French)	C	274	76	34			39		P			17	
	D	32	18				3					2	
Syria: Beirut	C	7	7	2	1								

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
British East Africa (see also table above):							
Kenya	C	171	142	186		424	
Uganda	C	78					
	D	69					
Chosen	C	107		3	2		
	D	35					
Seishin	C	2	1	2			
	D	1					

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
France	C	51		1			
Mexico Durango (see also table above)	D	4	3	3	3	2	
Morocco	C	18	5	3	8	1	4
Turkey	C	16					

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Aug. 24-Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930 4	11	18	25	November, 1930 1	8	15	22	29	Dec. 6, 1930
Algeria:																
Algiers	C	3	6	2	3							1			2	
Constantine Department	C	12	2	3			2			1					1	
Oran	C	4	3	1	1			1	2						3	
Bulgaria	C	16	10	1	4	2		1	3			1	2	1		
	D	1	1													
China:																
Manchuria—Harbin (see also table below)	C	8	2	2	2				1							
Shanghai	C			1												
Chosen (see table below).																
Czechoslovakia (see table below).																
Egypt:																
Alexandria	C	1	1	1	3	1							2		1	
Beheira Province	C	45	15		1											
	D	4	2													
Cairo	C			7	2											
Port Said	C			4	1		1			1	1					
Great Britain: Scotland—Dunfermline	C		1													
Greece (see table below).																
Ireland:																
Irish Free State—																
Galway County—Oughterard	C		2													
Leitrim County—Mohill	C	9	1													
Mayo County—																
Ballina	C	1	1													
Castlebar	C			1												
Westport	C		2	1												
Roscommon County—																
Roscommon	C		1													
Strokestown	C		1													
Wicklow County—Shillelagh	C	4	2													
Latvia (see table below).																
Lithuania (see table below).																

Mexico:																
Durango	D				1	1		1								
Mexico City, including municipalities in Federal District	C	9	5	9	7			3	5	1	1		4	1	1	
	D	1		2	2			2		1				2	3	
Morocco	C	15	11	8	2					1		1	1			
	D								1							
Palestine	C	2	6	3	3		1	1	1			2	1	1	6	
Poland	C	117	36	34	23	3	6	6	7	7	8	15	7	12		
	D	11	4	3	1	1			1					1		
Portugal: Oporto	C			1			1		1		2	1	1	2	2	
Rumania	C	58	28	9	4	3	4	1	6	4	13	10				
	D	5	8	2								1				
Spain	C	3	3		1			1	1			4				
	D		1		1			1	1							
Tunisia	C	18	24	10	6	1	1	1	9					5		23
Turkey (see table below).																
Union of South Africa:																
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P				
Municipality of East London	C		1		2			1								
Natal	C	P	1	P	P		P	P	2	P	P					
Orange Free State	C	P	P	P	P											
Transvaal	C		P	P	P	P	P	P	P	P	P	P				
Yugoslavia (see table below).																

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
China: Harbin (see also table above)	C	240		14	5		
Chosen: Seoul	C	43	2	3	2	1	
Czechoslovakia	C	12	1		1		
Greece: Athens	C	3	3	6	6	4	2
Latvia	C	3	3	3	1	2	
Lithuania	C	27	16	18	7	24	1
	D				1	2	
Turkey	C	16	2	7	2		
Yugoslavia	C	16	6				
	D	1					

YELLOW FEVER

	Cases
Brazil:	
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold Coast	
July 10, 1930	1
Albosso, Aug. 5, 1930 (death)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

X

UNITED STATES TREASURY DEPARTMENT

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SPECIAL ARTICLES

The Occurrence of Tularæmia in British Columbia

Duration of Selection Effect of Insurance Examinations

Two New National Institute of Health Bulletins

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division.*

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PUBLIC HEALTH REPORTS

VOL. 46 JANUARY 9, 1931 NO. 2

THE OCCURRENCE OF TULARÆMIA IN BRITISH COLUMBIA

By R. R. PARKER, *Special Expert, United States Public Health Service;* ERIC HEARLE, *Assistant Entomologist in charge, Insects Affecting Man and Animals, Entomological Branch, Canadian Department of Agriculture;* and E. A. BRUCE, *Animal Pathologist, Health of Animals Branch, Canadian Department of Agriculture*

The first diagnosed case of tularæmia in Canada was reported by McNabb, in February, 1930,[1] in a miner aged 34, living near Timmons, Ontario. Incidentally, it was also the first evidence that tularæmia was resident in the native fauna of Canada. In the present paper there is reported the recovery of *Bacterium tularense* McCoy and Chapin from a snowshoe rabbit (*Lepus americanus columbiensis* Rhoades), near Vavenby, British Columbia, in May, 1930. These two occurrences of tularæmia, the former in Ontario 400 miles north of the United States border, the latter in British Columbia over 200 miles north of the border, and the two localities over 1,500 miles apart from east to west, suggest the likelihood that tularæmia in the Canadian fauna is a widespread infection of many years' standing.

In the spring of 1930 one of us (Parker), upon request of the Dominion entomologist, Mr. Arthur Gibson, was detailed by the Surgeon General of the United States Public Health Service to visit British Columbia for the purpose of conferring with Hearle and Bruce concerning the occurrence of ticks and tick-borne infections in that Province. Incident to a trip into south central British Columbia during late April and early May, a snowshoe rabbit was autopsied which had an enlarged spleen and of which the liver showed lesions suggestive of tularæmia. This rabbit had been found near Vavenby, too weak to resist capture, by a local rancher and amateur naturalist, Mr. T. A. Moiliett, who, because of the animal's heavy infestation with ticks (*Haemaphysalis leporis-palustris* Packard), forwarded it to Hearle's laboratory at Kamloops.

Later, at the Public Health Service laboratory at Hamilton, Mont., some of the ticks and portions of the rabbit's spleen and liver (preserved in glycerin) were tested for the presence of *Bacterium tularense*.

[1] McNabb, A. L.: Tularæmia. The First Case Reported in Canada. Canadian Public Health Journal, vol. 21, February, 1930, pp. 91–92.

Three tick-injected guinea pigs and two of three injected with liver emulsion died in two to four days, and on necropsy all showed lesions typical of tularæmia. One liver- and three spleen-injected guinea pigs remained apparently well and when killed and autopsied were either negative or showed poorly defined lesions. Cultures recovered from one of the tick- and one of the liver-injected guinea pigs, when used as antigen, were agglutinated in high titer by known tularæmia immune sera, which similarly agglutinated a known *tularense* antigen.

In addition to these definite data, information suggestive of the occurrence of tularæmia in other parts of Canada was secured from Mr. Alex Dennis, of the Canadian Entomological Service, at Vernon, and from Maj. Allan Brooks, of Okanagan Landing. The former stated that in 1921, when living at Salmon Arm, British Columbia, he had killed snowshoe rabbits whose livers were "spotted"; and the latter said that when residing in Alberta "rabbit cycles" had been a familiar phenomenon, and that during epidemic years there was always an unusual amount of sickness among the resident settlers by whom jack rabbits were commonly used as food.

EFFECT ON LIFE INSURANCE MORTALITY RATES OF REJECTION OF APPLICANTS ON THE BASIS OF MEDICAL EXAMINATION

By Rollo H. Britten, *Associate Statistician, Office of Industrial Hygiene and Sanitation, United States Public Health Service*

The subject of the duration of medical selection due to rejections by life insurance companies on account of poor physical condition or disease has been discussed on many occasions in actuarial literature, but has not been taken up very often in publications relating to public health and vital statistics, although it is an important factor in the interpretation of life insurance mortality. Let that be the excuse for recurring at this time to a subject which was termed "threadbare" by George King in 1878.[1] It is always well, furthermore, to check up on previous conclusions whenever new data become available, especially since the relation between actuarial mortality and that of the general population appears to have changed greatly in the last half century.

The factor of selection which originally received particular attention was "the selection which the assured exercise against the companies by dropping policies on healthy lives and retaining those on lives which have become bad or doubtful."[2] However, by 1870, the

[1] In the discussion of a paper by T. B. Sprague read before the British Institute of Actuaries. Journal of the Institute and Assurance Magazine, January, 1879, Vol. XXI, p. 263.

[2] On the Value of Selection as Exercised by the Policyholder Against the Company. John Adams Higham. Read before the British Institute of Actuaries, Mar. 31, 1851. The Assurance Magazine, vol. 1, No. III, April, 1851, p. 190.

importance of selection due to the medical examination was already recognized. For instance, at that time Sprague[3] stated: "It is universally acknowledged that the rate of mortality among assured lives is very light during the first few years that follow the grant of the assurance; being extremely small in the first year and gradually increasing until, after the lapse of a greater or less number of years, the mortality becomes, according to some authorities, equal to that indicated by tables deduced from the population at large and according to others still heavier. This is, of course, satisfactorily explained by the medical examination of the lives proposed for assurance, which has the effect of eliminating those persons who are suffering from such acute or chronic diseases, dangerous to life, as can be detected by the medical officers of the assurance companies." The subject of withdrawals, however, continued to be the major topic of discussion with reference to selection until rather recently. At the present time discussions of selection relate rather to that due to the medical examination, including reports on the family history, personal history, and habits of persons applying for insurance (recently termed "temporary selection" by Elderton[4]), and a permanent force due to the class of lives involved ("permanent selection"). Without expressing an opinion as to whether the withdrawals ever did have an appreciable effect on the assured mortality rates, I believe we can follow Elderton's lead and disregard this phase of the subject. In passing, it may be said, however, that previously more reasonableness attached to the view that withdrawals did constitute a factor of selection against the company, because the mortality rate among insured lives was believed to be as high as or higher than that in the general population. As is well known, the contrary is true to-day for "ordinary" policyholders, a point which will be referred to later.

Henry Moir, in 1919,[5] stated that: "More recently it has been urged that withdrawals do not have the effect of reducing the proportion of healthy lives; indeed, the direct contrary is sometimes accepted on the ground that withdrawal from a company in good standing is more frequently a result of financial embarrassment or irregular habits."

The duration and total effect of "temporary selection" on the mortality of assured persons have become important points in the

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[3] On the Rate of Mortality Prevailing Among Assured Lives, as Influenced by the Length of Time for Which They Have Been Assured. Thomas B Sprague Journal of the Institute of Actuaries and Assurance Magazine, Vol. XV, Part V, April, 1870, p 328

[4] (a) Report on the Results of an Investigation of the Mortality Experience of Life Annuitants During the Period 1900–1920. W Palin Elderton and H. J. P. Oakley. Journal of the Institute of Actuaries, Vol. LIV, Part I, p. 43, March, 1923.

(b) Notes on the Interpretation of "Select" Rates of Mortality. W. Palin Elderton and H. J. P. Oakley. Journal of the Institute of Actuaries, Vol. LV, Part I, p 1, March, 1924

[5] Sources and Characteristics of the Principal Mortality Tables. Henry Moir. Actuarial Studies No. 1. Published by the Actuarial Society of America, 1919, p. 44.

minds of actuaries in this country, following the adoption a few years ago by certain Canadian companies of the principle of insuring persons without medical examination.[6] It is the general feeling that most of the selection wears off in the course of two years, but that a residue remains for some years. There is a great difference of opinion in regard to the matter. Henry Moir states that "it is the general opinion that the effects of the first selection never entirely disappear."[7] On the other hand, Elderton believes that the period of "temporary selection" has frequently been overestimated because of the gradual decrease with time in the mortality rates analyzed.[8] Thus there would seem to be a place for a further analysis of assured mortality data from this point of view. A measure of the degree of the selection in terms of mortality has not been completely worked out and is, no doubt, a changing element. For instance, Moir states that "the influence of medical selection is more persistent, and especially conspicuous amongst younger men." It might be expected that advance in medical science, with the development of urinalysis and other laboratory technique, would tend to make the selection more far-reaching in its effect.

One will realize that there is a corresponding selection in the case of annuitants, but due to a quite different cause. Persons who do not believe themselves to be in good health are not likely to take out annuity policies. Here again the maximum effect of this selection will be found in the early years of the policies. As the present study was not concerned with annuitants, no data on this phase of selection is included.[9]

The material for the present study is based on a joint investigation on occupational mortality by the Actuarial Society of America and the Association of Life Insurance Medical Directors.[10] As a basis for the occupational comparisons, data were secured for ordinary business[10a] during the years 1915-1926, involving $546,357,000 in death claims. It should be noted that these data were based on the amounts insured, rather than on policies (the unit being taken as $1,000, about the amount of the average policy), but it was not be-

[6](a) Life Insurance Without Medical Examination. D. E. Kilgour. Transactions of the Actuarial Society of America, May 19 and 20, 1921. Vol. XXII, Part 1, p. 120.

(b) Actuarial Note. Insurance Without Medical Examination. Savings in Expense Compared With Expected Extra Mortality. Arthur Hunter. Transactions of the Actuarial Society of America, May 19 and 20, 1921. Vol. XXII, Part 1, p. 140.

[7] Op. cit., p. 44.

[8] Elderton and Oakley. Op. cit., 1924.

[9] See Elderton and Oakley, 1923, Op. cit., for a recent study of selection in the case of annuitants.

[10] Joint Occupation Study: 1928. Compiled and published by the Actuarial Society of America and the Association of Life Insurance Medical Directors. New York. 1929. The chairman of the joint committee is Arthur Hunter, to whom grateful acknowledgment is made for review of the present paper.

[10a] Exclusive of industrial insurance where premiums are paid weekly or monthly.

lieved that this would result in any marked differences.[11] The data were graded to form tables of mortality rates from which to calculate the expected number of deaths in any occupation; but for the present purpose it seems preferable to employ the ungraded data (number exposed to risk and number of deaths by age of the policy and age at entry) to avoid possibility of errors entering into the calculations because of the method of grading. The number exposed to risk and the number of deaths are given in two appendix tables. The data were secured from 10 large insurance companies.

The basic data are given in the joint report in two ways: First, for the whole period 1915-1926 (being carried to the anniversaries of the policies in 1927), and second, for a part of this period for which some additional data were available, 1920 1926. It is a significant point that only policies *taken out* during the two periods are included, so that the maximum length of policy for the total period is 12 years and for the period 1920-1926 is seven years.

In determining the most logical way of handling the material, it was felt that the first consideration was the elimination of the effect of the influenza epidemic of 1918-19, since this not only greatly increased the rates, but exerted its influence mostly among young adults. The second period (1920-1926) was almost free from this effect, but had the unfortunate difficulty of being only seven years in duration. Furthermore, it was evident that in this case all of the deaths occurring during the seventh year of the policies would be in 1926, and all of the deaths during the sixth year of the policies would be in 1925 or 1926—i. e., at the very end of the period and based on relatively small numbers.[12] It seemed best, therefore, to use the 1920–1926 data for the first four years of the life of the policies, and the 1915–1926 data for the succeeding eight years. The effect of the epidemic was eliminated in this way; since even when the full period was used all deaths must have occurred after 1919, data for less than 4-year policies being used only for the period 1920-1926.

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[11] The point should be made, however, that the deaths are based upon death claims actually paid. Rejection of claims in the first year would therefore be one of the factors included in "temporary selection" as understood in this paper

Quotation is made from the Joint Report in regard to the use of amounts, as follows.

"Material for the mortality rates was furnished by each company in the same form as was used in the occupational classes. The latter were derived by policies, as the committee were satisfied that the mortality by policies would not differ essentially from that by amounts, especially in view of the small average policy in this investigation. In the case of the basic tables, however, the material had already been prepared in some of the companies by amounts for dividend purposes and in several of these institutions it would have been very laborious to obtain the exposures and deaths by policies. The data for amounts insured were therefore used for the basic tables." These are the data employed in the present analysis.

[12] Similarly, of course, for the 1915-1926 data, the deaths during the twelfth year would also be in 1926, etc., but after the policies had been in force for so long a period as this, the lack of precise data did not seem of importance (even if they could have been secured).

Recent investigations have brought out certain difficulties in determining the duration of selection due to the inclusion of data covering a long period of time during which the mortality rate and other relations may be changing. It is of interest to quote the following from Elderton:[13]

The simplest safeguard against misstating the period of selection probably lies in frequent investigations and the examination of the statistics obtained. We are inclined to take the view that by making past investigations over a long period of years in order to get a mass of data and thus reduce "errors of observation," we have introduced persistent errors which are of greater importance and have created for ourselves the inconvenience of showing temporary selection for a longer period than is justified by the statistics or necessary for calculations depending on an assumed future mortality. We feel that the true period of temporary selection can only be ascertained with certainty by the examination of homogeneous facts, and while we recognize that actuaries have always attached importance to homogeneity, we believe that there are more factors involved than has sometimes been assumed and that one of the most important of them is time.

It can be shown that the present material is reasonably free from such difficulties, especially since the total period (1915–1926) has only been used for policies of five years or more duration and therefore only deaths occurring during 1920-1926 have been used in the calculations. The mortality rate in this country has shown steady improvement in the past, but during the years 1920 to 1926 remained at a constant level. The crude mortality rates for these years in the total registration area were: 1920, 13.0 per 1,000; 1921, 11.6; 1922, 11.8; 1923, 12.3; 1924, 11.8; 1925, 11.9; 1926, 12.3.[14]

A fundamental difficulty in the present analysis will lie in the fact that the material is given according to the age at issuance, not the true age. For instance, Table 1 presents the annual death rates according to the age of the policy and age at issuance, and the reader will see at once that a directly vertical comparison is not possible, since persons classed in the age group 15 to 19, but with sixth year policies, were really in the age group 20 to 24. In other words, one year is added to the age for each step down the table. This fact is indicated by the figures in boldface, three age groups having been selected to emphasize the point. As the data were collected from the insurance companies in 5-year age groups, no direct correction is possible.

[13] Elderton and Oakley, Op. cit., 1920.

[14] In the spring of 1920 there was a recurrence of the influenza epidemic; but this could have affected only a relatively few assured persons—i. e., those taking out policies between Jan. 1, 1920, and the date of the wave of influenza and those taking out policies in the corresponding period of 1915.

Table 1.—*Annual mortality rates per 1,000 by policy year and age at issuance*

Policy year	Age at issuance of policy										
	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 and over
1920–1926											
First	1.96	1.76	**1.56**	1.76	2.34	2.94	**4.43**	6.06	10.49	14.66	**19.28**
Second	2.21	2.06	1.89	2.26	3.67	4.07	5.65	9.17	13.88	18.84	27.09
Third	2.14	2.28	2.19	2.56	3.81	5.08	7.39	11.47	17.74	17.52	40.28
Fourth	2.31	2.26	2.35	2.88	3.71	6.43	7.79	10.55	16.93	21.65	30.96
1915–1926											
Fifth	2.54	2.43	2.79	3.33	4.16	5.78	9.10	13.30	16.11	27.33	35.49
Sixth	2.68	**2.37**	2.75	3.42	4.72	**7.38**	11.15	14.89	23.31	**31.40**	55.85
Seventh	2.64	2.30	2.61	3.49	4.88	7.25	10.55	17.92	26.10	35.33	65.14
Eighth	2.54	2.22	2.85	3.82	5.87	8.35	11.11	19.01	29.46	45.51	48.71
Ninth	2.06	2.66	3.10	4.15	6.14	10.46	13.07	21.74	27.75	56.79	52.52
Tenth	2.72	2.62	3.42	4.01	6.14	9.71	13.32	21.02	31.19	45.36	54.56
Eleventh	**2.29**	2.92	3.10	4.59	**7.96**	9.21	18.90	21.13	**41.14**	36.86	103.91
Twelfth	2.70	2.33	3.57	4.69	8.01	11.19	16.47	30.62	38.74	93.25	219.21

If one follows down the rates given in boldface, or the intervening values, it will at once be evident that there is a factor of selection that is gradually dissipated—that as the policies become older, the mortality rates rise. Selective factors having to do with the type of person taking out insurance would exert a constant effect regardless of the number of years the policies have been in force. It appears a natural assumption that the selective factor which gradually fades out is that due to the medical examination (neglecting the small effect of withdrawals of healthy lives, already discussed). Furthermore, we can feel that this factor has ceased to be effective when the mortality rates for the same true age no longer rise as the policy years increase.

In the next table a comparison is made for the first, sixth, and eleventh year policies, because in that case it is possible to move the rates over one age group (in the case of the sixth year policies), and two age groups (in the case of the eleventh year policies). The table also gives the ratios to the first year policies. The indefinite age group, 65 years and over, is omitted.

Table 2.—*Annual mortality rates per 1,000 for first, sixth, and eleventh policy years by true age, with ratios to first year*

Policy year	Attained age at specified policy year									
	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64
RATE										
First	1.96	1.76	1.56	1.76	2.34	2.94	4.43	6.06	10.49	14.66
Sixth		2.68	2.37	2.75	3.42	4.72	7.38	11.15	14.89	23.31
Eleventh			2.29	2.92	3.10	4.59	7.96	9.21	18.90	21.13
RATIO TO MORTALITY RATE IN FIRST POLICY YEAR										
First	100	100	100	100	100	100	100	100	100	100
Sixth		152	152	156	146	161	167	184	142	159
Eleventh			147	166	132	156	180	152	180	144

Even from this crude summary of the data two facts emerge: that there is an increase of more than 50 per cent in the mortality from the first to the sixth years, and that after this time there is no appre-

ciable increase. This is shown very clearly from Figure 1 where these three curves have been plotted, allowing for the increase in age as the number of policy years increased.

It is suggested that somewhere between the first and the sixth year the effect of selection ceases to be operative so far as all causes of mortality are concerned. One may imagine that in the case of a specific disease, such as tuberculosis, this effect might persist for a much longer time, but information on that point is not at present

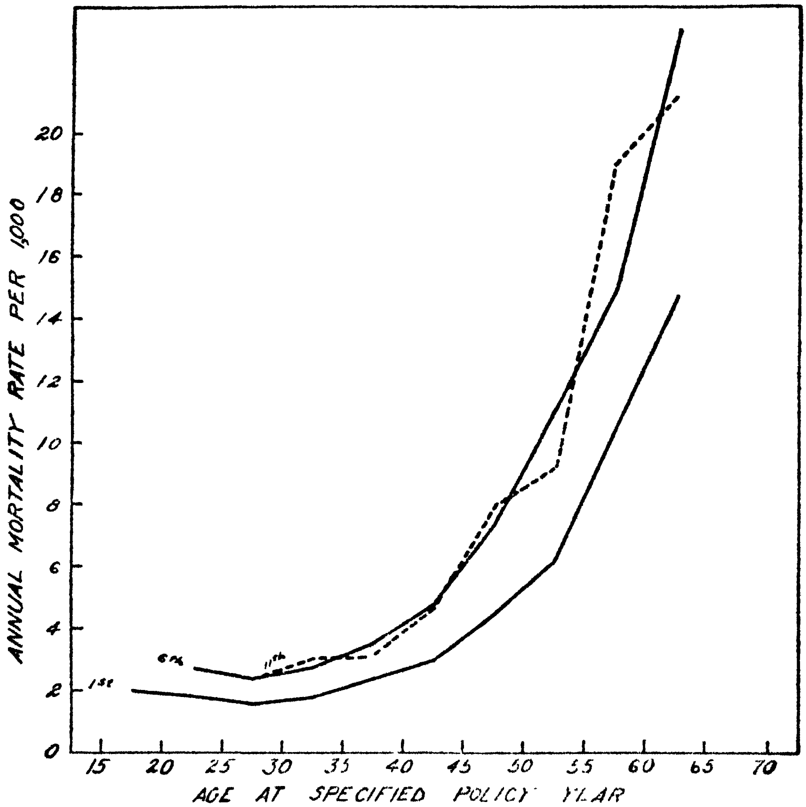

FIGURE 1.--Mortality rates for the first, sixth, and eleventh policy years, by true age

available. Furthermore, no question is raised now as to the factors of selection that differentiate the insured persons from the total population. We are concerned only with the effect of selection resulting from the medical examination itself. Later comparison will be made with the general population.[15]

[15] For the reader who is doubtful about the results owing to the effect of time, it may be pointed out that the comparison between the first and sixth years is entirely free from such a factor. In both cases all deaths occurred during the period 1920–1926, since the first-year policies were based on that period and deaths for sixth-year policies would not have occurred before 1920. The same would be true in comparing the second and seventh year policies (based on 1921–1926) and the third and eighth year policies (based on 1922–1926), etc

In the next graph an attempt has been made to deal with the intermediate curves. It is evident that the age of persons in the second policy year will, on the average, be one year greater than of those in the first policy year. Therefore a lag of one year is allowed in plotting the second policy year curve, etc. In this case semi-logarithmic paper has been employed to bring out the relative differences between the curves and especially to emphasize the differences in the earlier part of life, which would be more or less lost in a comparison on arithmetic paper.

One finds a definite excess in mortality for persons in the second year of their policies compared with those in the first year. The third

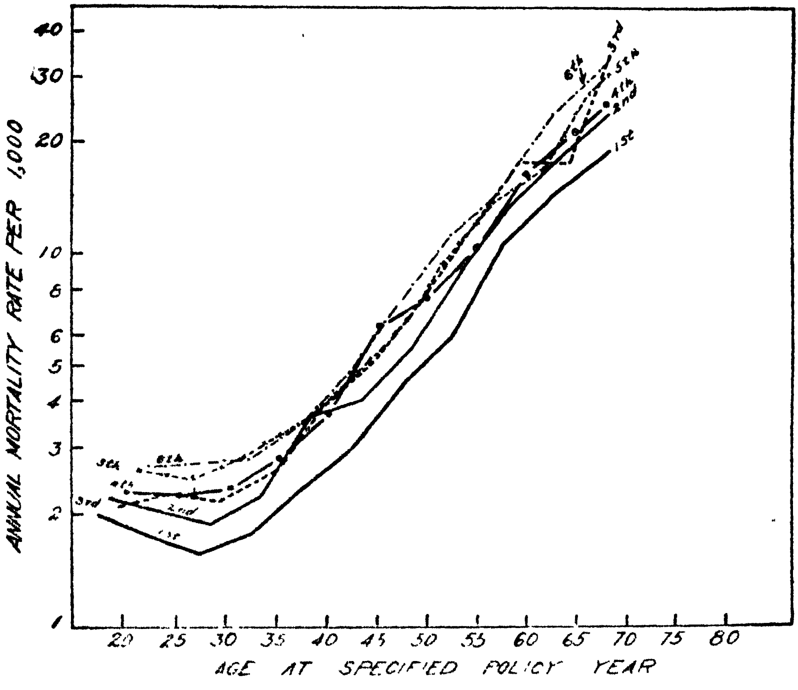

FIGURE 2. Mortality rates for the first policy years, by true age

year also shows an additional increase in mortality, but of no great amount. The curve for the fourth year is, if anything, slightly under that for the third, but the fifth again shows a small increase. The mortality rate seems quite stabilized by the sixth year.

It was realized that a more intelligible expression of this relation would be secured if the number of years the policies had been in force could be used as the base line rather than the age. Although it would not be possible to disregard age, it did seem practicable to deal with three or four broad age groups showing curves for each. The difficulty, of course, lies in allowing for the fact that the data were

according to age at issuance of the policies. An approximate but simple method was devised to allow for this factor. Suppose we take the age group 25 to 34. For the first policy year, the rate could be easily calculated from the number of persons exposed to risk and the number of deaths in the two 5-year age groups. For the second policy year, it seemed accurate enough to add to these figures one-fifth of the persons and deaths in the age group 20 to 24, and to deduct from them one-fifth of the persons and deaths in the age group 30 to 34. For the third policy year, in the same way, two-fifths would be added from the 20 to 24 age group and two-fifths deducted from the 30 to 34 age group; and so on. This method was applied consistently for the succeeding broad age groups. Table 3 gives the results.

TABLE 3.—*Annual mortality rates by year of policy for three age groups, with ratio to first year* [1]

Policy year	Attained age group		
	25 to 34	35 to 44	45 to 54
RATIO TO FIRST YEAR			
First	100	100	100
Second	124	140	126
Third to fourth	143	148	149
Fifth to sixth	160	153	162
Seventh to ninth	153	157	165
Tenth to twelfth	162	151	167
DEATH RATE PER 1,000			
First	1.67	2.61	5.02
Second	2.07	3.65	6.31
Third to fourth	2.39	3.87	7.47
Fifth to sixth	2.68	3.99	8.14
Seventh to ninth	2.55	4.10	8.28
Tenth to twelfth	2.71	3.93	8.36
EXPOSED TO RISK [2]			
First	7,836,580	7,480,665	3,501,176
Second	5,275,378	5,540,249	2,890,507
Third to fourth	6,258,637	7,136,339	4,082,861
Fifth to sixth	5,412,464	6,829,047	4,149,447
Seventh to ninth	3,384,605	5,056,611	3,565,928
Tenth to twelfth	690,287	1,294,748	1,037,600
NUMBER OF DEATHS [2]			
First	13,101	19,496	17,579
Second	10,932	20,217	18,230
Third to fourth	14,937	27,630	30,496
Fifth to sixth	14,512	27,247	33,792
Seventh to ninth	8,614	20,752	29,543
Tenth to twelfth	1,874	5,090	8,671

[1] First 4 insurance years, based on 1920–1926 data, the remaining years based on 1915–1926 data.
[2] Based on amounts insured and death claims paid, converted into persons on a unit of $1,000.

In addition to the number exposed to risk and the number of deaths, the table gives the corresponding annual death rates, and also the ratio to the rate for the first year. A rather broad grouping of policy years has been followed in order to give regularity to the results.

The death rates from this table are reproduced in Figure 3. The higher age groups naturally have the higher mortality rates, but the point of particular interest is the rise in the curves during the earlier years of the policies. The significance of these curves is much better brought out by the ratios given in the preceding table, since these

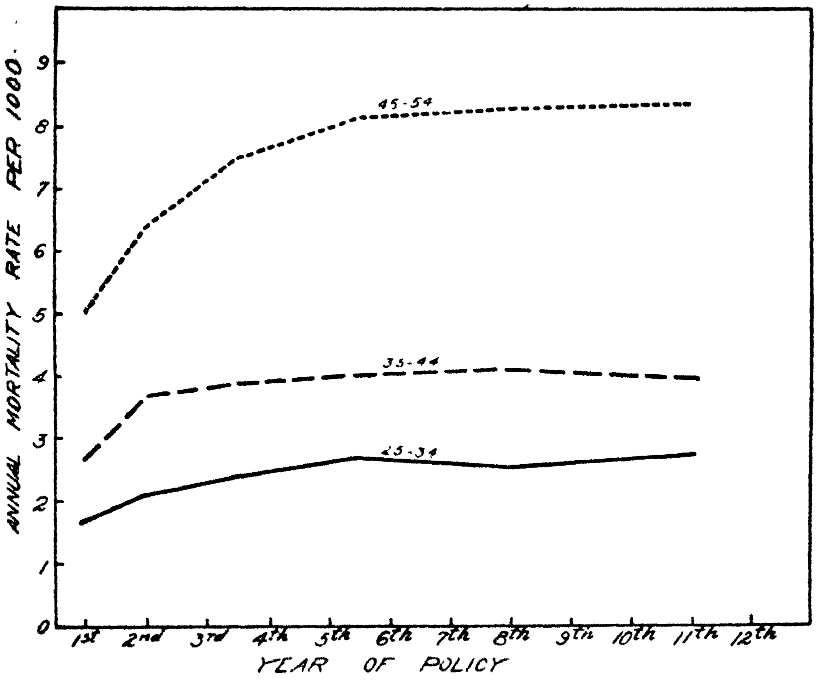

FIGURE 3 - Mortality by years of policy for three age groups

ratios bring the three age groups together at the beginning of policy life. The ratios are plotted in Figure 4 The results are quite consistent for the three age groups, and point unmistakably to the fact that the duration of selection due to the medical life insurance examination, taking all causes together, is hardly more than three or four years.

An estimate of the lessened mortality rates in insurance data as a result of the medical examination can be obtained from this graph. The ratio reaches a level of about 158. In other words, in the first year the mortality is 37 per cent less than it would be if we could imagine the insuring of people without examination, other factors

remaining the same.[16] In the second year the percentage is about 18; in the third, about 10; in the fourth, about 5. After that the difference is nominal.

In this comparison no reference has been made to the highest ages. It was felt that persons applying for life insurance much above the age of 50 formed a special group and were given a more thorough examination. The numbers were also small for these advanced ages and inconsistent results were noted on analysis. For these reasons, no consideration has been given to the higher ages other than that already given in the curves according to age. (Figs. 1 and 2.)

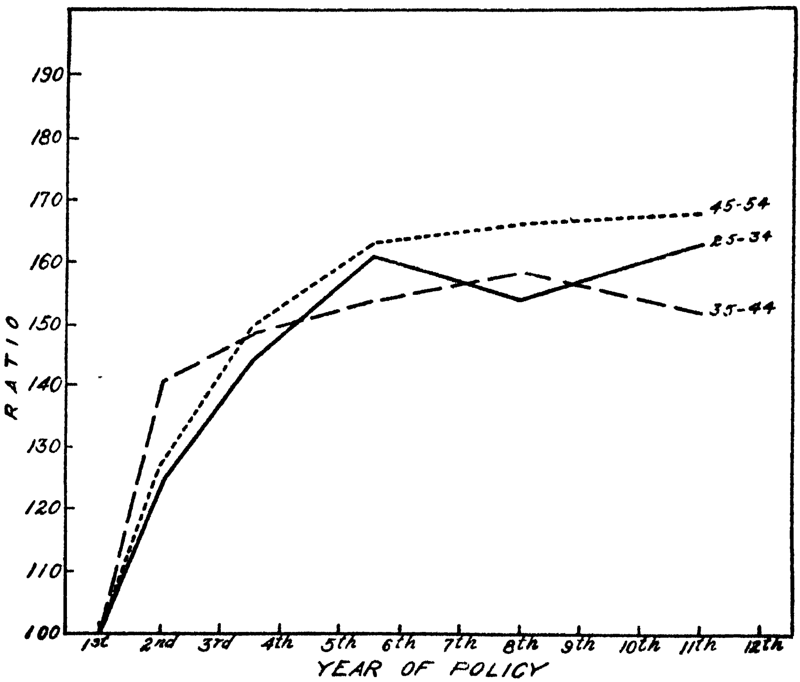

FIGURE 4.—Ratios of mortality in succeeding years of policy life to that in first year, for three age groups

No doubt the reader will wish to know how these mortality rates compare with those in the general population. In the next table a brief comparison of this sort is made. The rates for the sixth policy year [17] are used, since it has been shown that by this time the effect of selection due to the medical examination has been eliminated and because these rates could be used in a comparison according to age by adding five years to the age group as originally classified. This has been done. The general mortality is based on white males and

[16] (158—100) divided by 158.

[17] The fifth, sixth, and seventh year policies were taken together to form these actuarial mortality rates in order to give smoothness to the ratios.

females in the registration States for the years 1920–1926. The rates for sixth year policies for the period 1915–1926 are based on deaths occurring since 1920, and therefore comparable chronologically. The table also gives the ratio of the rates in the Registration States to those for the actuarial data.

TABLE 4.—*Annual mortality rate by true age, for actuarial data (average for fifth, sixth, and seventh policy years) and registration States, 1920–1926*

	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64
RATE									
Actuarial	2.61	2.38	2.73	3.40	4.53	6.67	10.12	14.95	21.04
Registration States	3.79	4.18	4.99	5.99	7.64	9.66	13.72	20.12	29.36
RATIO OF RATE FOR REGISTRATION STATES TO THAT FOR ACTUARIAL DATA									
	145	176	183	176	169	145	136	135	140

It appears that, even after the effect of selection due to the medical examination has been dissipated, the mortality rates for people insured at ordinary rates are much lower than those for the general population, the excess for the latter being in the vicinity of 50 per cent. This is to be accounted for by a difference in social or economic level, and in general indicates the effect of "permanent selection" due to the class of lives involved, referred to by Elderton. (See p. 47.) It is notable that the mortality for insured wage earners (industrial policies) is higher than that in the general population,[18] the most marked difference occurring as here, in the younger adult ages, which are also the ages showing the greatest difference in mortality rates by economic status (England and Wales).[19]

It is possible, however, that part of the difference in the actuarial data is due to some inherent peculiarity in this material. For instance, it is noted in the Joint Report that the ratios of the basic data to the American Select Men table were higher in the older ages. In other words, there was an indication that the mortality rates based on the recent data were apparently too low in the early part of life. If this is true, then the ratios of the rates for the registration States to the basic data are too high at these ages.

A further point should be kept in mind, if any precise comparison of assurance and general mortality is desired. The data considered in this paper were based on amount of policy and death claims. Thus,

[18] Mortality Statistics of Insured Wage-earners and Their Families. Experience of the Metropolitan Life Insurance Company industrial department, 1911 to 1916, in the United States and Canada. By Louis I. Dublin, with the collaboration of Edwin W. Kopf and George H. Van Buren. New York: Metropolitan Life Insurance Co., 1919.

[19] Registrar General's Decennial Supplement, England and Wales, 1921, Part II, Occupational Mortality, Fertility, and Infant Mortality, London. 1927.

twice as much weight is given to deaths among persons carrying \$2,000 of insurance as to those among persons carrying the unit of \$1,000. To what extent the additional weight given to larger policies—i. e., those of persons in the higher economic or social levels or in the more responsible situations—affects the mortality rates in this group, is difficult to say.

Reference has already been made to the impossibility of making any satisfactory comparisons with respect to individual causes of mortality. The actuarial data as to cause of death were not obtained according to year of the policy and age at issuance. They were secured in two broad age groups. It is of interest, however, to make a brief comparison in these two broad groups. For the actuarial material, the groups are 15 to 39 and 40 and over (ages at issuance). The first group can be compared with some logic with the corresponding group of the general population, but the latter group can not, since there are relatively few persons exposed to risk in the higher ages, due primarily to the brief period covered by the actuarial data. It was felt that the most logical comparison would be with the age group 40 to 59 for the registration States. The period of 1920-1926 is used for both sets of data to avoid the effect of the influenza epidemic. The rates and percentages according to cause are given in Table 5.

TABLE 5.—*Death rates per 100,000 and percentage by cause in two age groups: registration States and actuarial data, 1920–1926*

Cause	15 to 39 years				40 to 59 years				15 to 59 years			
	Rate		Percentage of deaths due to each cause		Rate		Percentage of deaths due to each cause		Rate		Percentage of deaths due to each cause	
	Registration States	Actuarial	Registration States	Actuarial	Registration States	Actuarial[1]	Registration States	Actuarial[1]	Registration States	Actuarial	Registration States	Actuarial
All causes	421.4	245.0	100.0	100.0	1,184.1	699.2	100.0	100.0	673.1	354.3	100.0	100.0
Tuberculosis of the lungs	[illegible]	32.2	21.5	13.0	101.8	23.8	8.6	3.4	95.3	30.2	14.2	8.5
All diseases of the heart	31.4	10.2	7.3	[2] 4.1	189.2	[2] 72.7	16.0	[2] 10.4	82.4	[2] 24.8	12.2	[2] 7.0
External causes other than suicide	[illegible]	50.6	14.8	[3] 20.4	88.1	[3] 71.3	7.4	[3] 10.2	71.4	[3] 55.7	10.6	[3] 15.7
Cancer and other malignant tumors	14.5	11.8	3.4	4.8	167.2	88.1	14.1	12.6	63.8	30.2	9.5	8.5
Pneumonia—all forms	32.9	17.9	7.7	7.2	82.8	48.2	7.0	6.9	49.0	25.2	7.3	7.1
Nephritis and Bright's disease	15.9	6.9	3.7	2.8	104.4	35.0	8.8	5.0	44.5	13.5	6.6	3.8
Cerebral hemorrhage and apoplexy	4.6	2.7	1.1	1.1	85.3	40.6	7.2	5.8	30.7	11.7	4.6	3.3
Influenza	18.5	7.2	4.3	2.9	28.1	19.6	2.4	2.8	21.7	9.9	3.2	2.8
Suicide	11.0	10.9	2.6	4.4	26.1	28.0	2.2	4.0	16.0	14.9	2.4	4.2
Appendicitis and typhlitis	14.5	17.1	3.4	6.9	18.6	23.8	1.6	3.4	15.8	18.8	2.4	5.3
Diabetes	4.7	1.7	1.1	.7	26.7	4.9	2.3	.7	11.8	2.5	1.8	.7
Other tuberculosis	8.7	5.0	2.1	2.0	9.5	4.2	.8	.6	9.0	4.6	1.3	1.3
Typhoid and paratyphoid	7.9	[4] 5.0	1.8	[4] 2.0	5.5	[4] 4.9	.5	[4] .7	7.1	[4] 5.0	1.1	[4] 1.4
Cirrhosis of liver	1.3	.7	.3	.3	13.7	7.0	1.2	1.0	5.3	2.2	.8	.6
All other causes	105.6	68.0	25.1	27.4	236.5	227.1	20.0	32.5	149.2	105.1	22.2	29.8

[1] 40 and more

[2] Organic disease of heart

[3] "Accident due to occupation" and "accident not due to occupation." These high rates are to be explained in part as being due to double accidental death provisions, since the data are by policies, not by persons.

[4] Typhoid

We have not felt that the rates themselves were of any great significance, owing to the differences which have been brought out in this paper. The percentages, however, put the comparison on a relative basis and make it much more interesting. Therefore the percentages have been plotted in Figure 5. The indications are more or less what would be expected, primarily a lower relative mortality

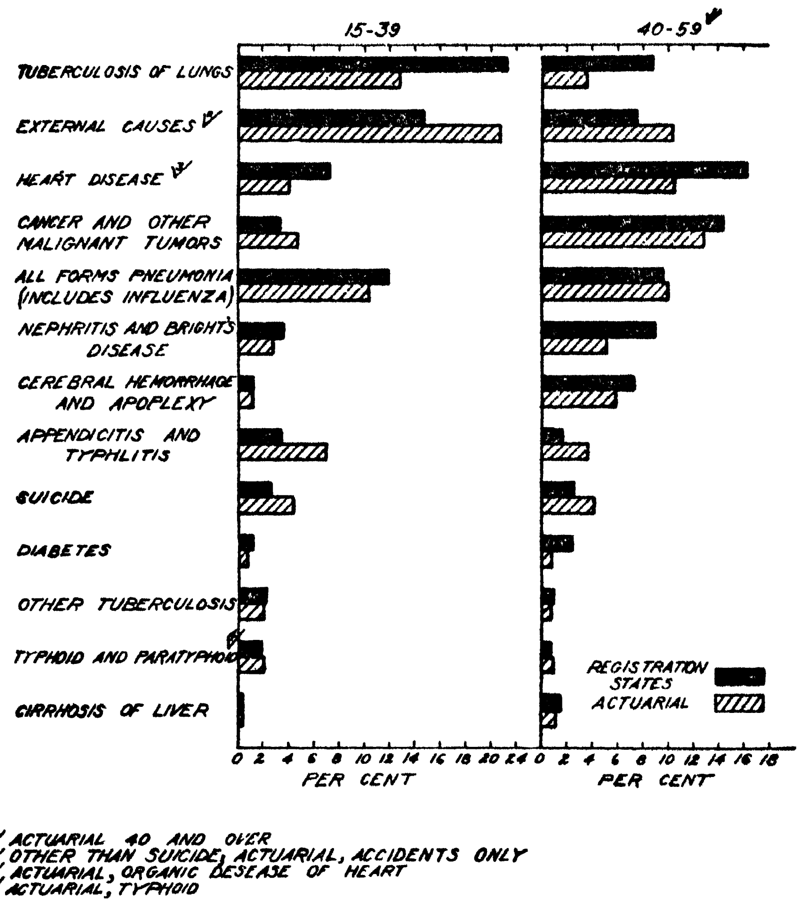

FIGURE 5.—Percentage of deaths, by cause, in two age groups, registration States and actuarial data, 1920–1926

from tuberculosis, heart disease, and some other degenerative diseases among the insured persons.

The particular bearing of these findings upon the major findings of this paper is the suggestion that the duration of selection due to the medical examination may not be identical for different causes of mortality, and may prove to be much greater for those causes given special stress in the medical examination.

It is of interest that various acute causes of death—external causes, for instance—and cancer (where the medical examination could not be a selective factor of any moment) do not show an excess in the mortality rates for the registration States.

The following conclusions are suggested:

1. The insurance medical examination results in a lower mortality during the earliest policy years.
2. The duration of such selection would appear to last for three or four years for all causes, except possibly at the highest ages.
3. Most of the difference occurs in the first year or two of policy life.
4. The ratio of the mortality rate in successive policy years to that in the first year reaches a comparatively constant level at about 158.
5. For certain diseases, such as tuberculosis and heart disease, it is possible that the selective factor is of much longer duration.

The direct application of these conclusions in the field of public health should be discussed. Perhaps of most importance is the bearing which they may have upon the value of the medical examination, or the so-called periodic health examination, in the assessment of physical condition.

Life-insurance mortality data are increasingly important as a measure of the vitality of our people, because of the fact that the number exposed to risk is accurately known and the knowledge in regard to insured persons is much greater than that obtained in the course of securing Census data. This fact is now being realized and we may expect in the future that life-insurance records will be given more thorough analysis. Interpretation of such data is difficult without a knowledge of the effect of selection due to the medical examination. On the basis of the conclusions presented in this paper it is possible to show that such mortality rates can be used as a measure of health; in other words, that the medical examination in itself does not interfere seriously with the comparability of the material.

It is also important that it should be understood generally in connection with the analysis of life-insurance mortality data that if we exclude special mortality issued on industrial groups, these rates to-day are definitely below those of the general population.

APPENDIX TABLE

Number of persons exposed to risk and number of deaths classified by age at entry and by insurance year [1]

Insurance year	Age at entry										
	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 and over
	EXPOSED TO RISK [2]										
First	1,288,063	2,624,578	3,612,033	4,224,747	4,164,913	3,315,772	2,224,245	1,276,931	565,367	168,949	30,503
Second	918,825	1,796,178	2,513,977	3,092,679	3,012,532	2,408,901	1,652,557	945,325	410,329	123,530	20,755
Third	664,710	1,320,320	1,[illegible],174	2,194,719	2,201,738	1,768,532	1,21[illegible],2[illegible]3	687,258	297,829	86,028	14,671
Fourth	470,651	955,411	1,344,913	1,585,381	1,579,889	1,152,322	862,165	475,722	204,609	58,566	8,397
Fifth	555,953	1,212,547	1,717,341	1,957,515	1,894,530	1,479,977	977,006	508,436	216,314	61,356	9,637
Sixth	446,887	914,284	1,393,278	1,567,679	1,480,831	1,147,706	739,066	380,584	160,851	43,856	6,911
Seventh	335,562	775,831	1,0[illegible],237	1,233,670	1,150,238	896,065	567,311	289,930	122,736	32,886	5,235
Eighth	228,443	535,850	774,100	869,145	802,380	625,046	401,976	206,025	87,869	23,729	3,901
Ninth	137,850	352,409	485,221	545,617	500,551	389,350	262,252	135,678	60,657	15,460	2,761
Tenth	88,130	257,921	345,043	360,687	322,648	261,589	168,958	90,802	40,464	10,140	1,888
Eleventh	48,445	150,470	205,019	210,278	187,435	151,280	98,0[illegible]8	53,715	22,604	5,778	1,126
Twelfth	26,025	68,641	88,049	87,779	77,629	61,762	41,345	21,948	8,364	2,209	406
	NUMBER OF DEATHS [2]										
First	2,339	4,628	5,654	7,447	9,749	9,747	9,847	7,732	5,929	2,476	588
Second	2,039	3,733	4,777	6,793	11,051	9,796	9,345	8,665	5,697	2,327	500
Third	1,434	3,093	4,0[illegible]3	5,327	8,410	8,991	8,909	7,881	5,283	1,518	679
Fourth	1,083	2,158	3,171	4,572	5,862	7,414	6,714	5,019	3,465	1,268	260
Fifth	1,413	2,944	4,798	6,623	7,886	8,557	8,889	6,762	3,567	1,677	342
Sixth	1,169	2,282	3,730	5,361	6,991	8,466	8,239	5,672	3,749	1,377	386
Seventh	885	1,740	2,781	4,305	5,608	6,451	5,954	5,196	3,203	1,162	341
Eighth	6[illegible]1	1,197	2,148	3,321	4,714	5,222	4,496	3,917	2,589	1,080	190
Ninth	[illegible]	939	1,503	2,236	3,071	4,179	3,432	2,950	1,562	878	145
Tenth	222	701	1,180	1,472	1,957	2,489	2,251	1,909	1,262	460	103
Eleventh	111	466	636	965	1,492	1,393	1,853	1,135	930	213	117
Twelfth	54	130	314	412	622	691	681	672	324	206	89

[1] First 4 insurance years, based on 1920-1926 data the remaining years, on 1915-1926 data.
[2] Based on amounts insured and death claims paid, converted into persons on a unit of $1,000.

PARASITES OF BATS

The United States Public Health Service has issued four bulletins as a key catalogue of the parasites of man, and a fifth bulletin of this series dealing with the parasites of monkeys in their relation to public health.

There has recently been published a sixth number of the series, National Institute of Health Bulletin No. 155, entitled "Key-Catalogue of the Parasites Reported for Chiroptera, with Their Possible Public Health Importance," by Ch. Wardell Stiles and Mabelle O. Nolan.

Some bats are used as food. The members of one family (the *Desmodontidae*), known as "vampires," attack man and livestock, sucking the blood and causing wounds which may become fly blown and form portals of bacterial infection. It is popularly believed that bedbugs are distributed by bats, but this view is due to confusing the common bedbug with closely allied bugs which live on bats and in bat haunts. Occasionally bats are kept as household pets. Some bats feed on mosquitoes, and thus potentially contribute to a reduction of these pests and the diseases they carry, although evidence is lacking which would justify our building so-called "batteries," or bat roosts, as a panacea against mosquitoes. Bats have numerous parasites, both external and internal, and of these no less than 11 species are reported as parasites both of bats and of man. Three additional parasites of man, including the causative agent of African sleeping sickness, are transmissible experimentally to bats.

The bulletin gives a classification of the parasitic protozoa, worms, arachnoids, and insects reported for these hosts, together with a classification of the bats themselves, and under each species of host is given a list of the particular parasites reported for that particular animal.

The publication is exceedingly technical and is intended principally for distribution to public health officers, bacteriologists, and zoologists.

THE PATHOLOGY OF GENERALIZED VACCINIA IN RABBITS

An account of the pathologic histology of local and focal lesions of the skin, mucosæ, and viscera of rabbits produced by Armstrong's heat-selected vaccine virus is detailed in National Institute of Health Bulletin No. 156, recently issued by the United States Public Health Service. Also, the literature of the histology of variola and vaccinia is reviewed.

The visceral lesions are essentially coagulation necroses; those of the skin and mucosæ also show coagulation necrosis in addition to varied other proliferative, degenerative, hemorrhagic, and inflammatory changes.

The distribution of such focal lesions is summarized in tabular form according to organs and by routes of inoculation and lapse of time after inoculation.

This bulletin is intended for restricted distribution to persons especially interested in the subject.

COURT DECISION RELATING TO PUBLIC HEALTH

Relief not granted in action against city brought because marketability of oysters was affected by pollution of tidal waters.—(Connecticut Supreme Court of Errors; Lovejoy *v.* City of Norwalk, 152 A. 210; decided Nov. 7, 1930.) The plaintiff owned some oyster grounds under the navigable tidal waters of Long Island Sound in Norwalk Harbor. The title to such grounds had originated, pursuant to statute, in designations made by the oyster committee of the town of Norwalk, and had come to plaintiff by assignment from former owners. A substantial part had been purchased during and since 1925. Sewage from Norwalk had for more than 50 years been discharged into the tidal waters of Long Island Sound. The plaintiff had resided in Norwalk and had been in the oyster business for more than 30 years, and in all that period was familiar with the sewerage system maintained by Norwalk and its effect upon the tidal waters. Plaintiff's grounds, involved in this action, had been used exclusively for growing and fattening oysters transplanted from other localities. The discharge of sewage by the defendant city of Norwalk did not interfere with the health and growth of oysters upon the plaintiff's beds, but did introduce bacteria into the tidal waters. In 1925 the State health department adopted the policy of forbidding the marketing of oysters for human consumption from grounds within the State's jurisdiction unless an authorizing certificate was obtained. For the season of 1927–28, the plaintiff was refused certificates for the harvesting of oysters direct from his Norwalk beds, but was permitted to transplant oysters therefrom to other beds owned by him. In September, 1927, Norwalk employed competent engineers to make a survey of the sewage-disposal problem, and plans were submitted for the construction of a disposal plant. In November, 1928, the voters approved a proposal to issue bonds and to proceed with the building of the proposed plant. It was then the city's purpose, if legislative approval could be obtained, to construct such plant without delay. The plaintiff brought an action against the city of Norwalk for injury to his oyster grounds, resulting from the sewage discharged by the city. The judgment of the trial court in favor of the city was upheld by the supreme court of errors. After speaking of the city's action relative to the proposed disposal plant, the supreme court said:

* * * **We think that this situation affords no indication that the defendant city had acted unreasonably, or negligently failed to take steps toward correction of the conditions of which the plaintiff complains. * * ***

The supreme court stated the controlling conclusions reached by the trial court as follows:

* * * That the acts found were confined to tidal waters and did not constitute a public nuisance; that the plaintiff or his predecessors in title received their grants of oyster grounds subject to the public right of employing tidal waters for drainage purposes, and the exercise thereof by the defendant was not in derogation of any right of the plaintiff. * * *

After a discussion relative to the discharge of sewage into tidal waters and the designation, under the statutes, of places for the planting of oysters, the supreme court stated:

It follows, as stated subsequently by the United States Supreme Court in that case [Darling v. Newport News, 249 U. S. 540, 39 S. Ct. 371, 63 L. Ed. 759], that, as the trial court held, the recipients of the designations and the plaintiff, as their successor in interest, took the same subject to such rights as existed to discharge sewage into the waters of Norwalk River and harbor, and to the risk of the pollution of the water naturally resulting therefrom. * * *

The court also held against the plaintiff's further claim of an unconstitutional taking of his property without compensation.

DEATHS DURING WEEK ENDED DECEMBER 20, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended December 20, 1930, and corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)

	Week ended Dec. 20, 1930	Corresponding week, 1929
Policies in force	74, 932, 777	75, 191, 352
Number of death claims	13, 608	14, 578
Death claims per 1,000 policies in force, annual rate	9. 5	10. 1

Deaths [1] from all causes in certain large cities of the United States during the week ended December 20, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Dec. 20, 1930				Corresponding week 1929		Death rate [2] for first 51 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Total (78 cities)	7, 907	11. 9	638	[4] 61	13. 1	763	11. 9	12. 7
Akron	47	9. 6	2	18	8. 5	6	7. 9	9. 3
Albany [5]	30	12. 2	0	0	18. 6	3	14. 7	16. 3
Atlanta	85	16. 5	8	82	16. 3	10	15. 5	16. 0
White	50		5	79		4		
Colored	35	(6)	3	86	(6)	6	(6)	(6)

See footnotes at end of table.

Deaths[1] *from all causes in certain large cities of the United States during the week ended December 20, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929*—Continued

City	Week ended Dec. 20, 1930				Corresponding week 1929		Death rate[2] for first 51 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1930	1929
Baltimore[5]	188	12.2	13	45	16.8	17	14.0	14.7
White	150		12	53		11		
Colored	38	([6])	1	16	([6])	6	([6])	([6])
Birmingham	61	12.3	7	67	13.2	3	13.6	15.8
White	26		3	48		3		
Colored	35	([6])	4	98	([6])	0	([6])	([6])
Boston	194	12.9	21	61	14.1	27	14.0	14.9
Bridgeport	34	12.0	1	17	12.4	6	10.9	11.9
Buffalo	141	12.8	8	36	14.6	13	12.9	14.0
Cambridge	30	13.8	3	60	8.7	2	11.8	12.5
Camden	22	9.8	1	18	15.0	4	13.5	14.4
Canton	20	9.8	1	27	6.5	1	9.8	11.1
Chicago[5]	644	9.9	32	25	11.8	69	10.4	11.3
Cincinnati	132	15.3	9	53	18.2	11	15.6	17.0
Cleveland	160	9.2	15	45	9.9	22	11.0	12.3
Columbus	76	13.7	9	89	17.3	7	15.4	14.8
Dallas	58	11.5	4		13.3	9	11.4	11.6
White	46		3			7		
Colored	12	([6])	1		([6])	2	([6])	([6])
Dayton	47	12.2	1	15	9.3	4	10.8	11.5
Denver	94	17.0	14	153	14.3	9	15.0	14.8
Des Moines	29	10.6	0	0	11.1	5	11.6	11.5
Detroit	262	8.6	45	69	11.1	32	9.2	11.1
Duluth	23	11.8	1	27	13.4	1	11.5	11.5
El Paso	35	17.8	3		11.9	1	17.1	19.2
Erie	25	11.2	5	110	9.1	2	11.0	11.9
Fall River[5] [7]	29	13.2	1	23	16.8	4	11.7	13.5
Flint	20	6.6	1	12	6.5	3	8.9	10.5
Fort Worth	55	17.8	5		9.8	1	11.2	12.2
White	47		5			1		
Colored	8	([6])	0		([6])	0	([6])	([6])
Grand Rapids	28	8.6	1	15	7.8	0	10.1	10.1
Houston	58	10.3	12		17.1	5	12.2	12.7
White	43		11			2		
Colored	15	([6])	1		([6])	3	([6])	([6])
Indianapolis	90	12.8	2	15	16.2	8	14.3	14.8
White	75		2	17		6		
Colored	15	([6])	0	0	([6])	2	([6])	([6])
Jersey City	69	11.4	10	87	12.9	8	11.3	12.4
Kansas City, Kans	39	16.6	7	163	10.3	1	11.8	12.7
White	34		5	138		1		
Colored	5	([6])	2	303	([6])	0	([6])	([6])
Kansas City, Mo	56	12.7	3	25	11.4	9	13.4	14.0
Knoxville	18	8.8	0	0	9.5	1	13.4	13.7
White	13		0	0		1		
Colored	5	([6])	0	0	([6])	0	([6])	([6])
Los Angeles	304	12.7	34	103	13.5	25	11.1	11.4
Louisville	96	16.3	4	34	17.8	9	13.5	16.2
White	68		1	10		9		
Colored	28	([6])	3	190	([6])	0	([6])	([6])
Lowell[7]	14	7.3	2	53	18.5	3	13.2	14.2
Lynn	23	11.7	1	28	10.2	1	10.5	11.4
Memphis	90	18.6	7	82	16.3	10	10.9	18.8
White	41		0	0		5		
Colored	49	([6])	7	235	([6])	5	([6])	([6])
Milwaukee	119	10.9	25	110	11.1	24	9.8	10.9
Minneapolis	95	10.7	11	72	12.5	4	10.8	10.8
Nashville	46	16.3	2	31	10.2	5	17.2	18.7
White	24		2	42		2		
Colored	22	([6])	0	0	([6])	3	([6])	([6])
New Bedford[7]	28	12.9	3	77	9.7	3	11.0	11.9
New Haven	36	11.5	1	15	9.9	2	12.5	13.4
New Orleans	149	17.0	14	78	18.6	16	17.4	17.8
White	99		8	68		9		
Colored	50	([6])	6	97	([6])	7	([6])	([6])

See footnotes at end of table.

Deaths [1] ***from all causes in certain large cities of the United States during the week ended December 20, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929***—Continued

City	Week ended Dec. 20, 1930				Corresponding week 1929		Death rate [2] for first 51 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
New York	1,449	10.8	112	47	12.2	142	10.7	11.3
Bronx Borough	198	8.1	8	23	9.3	18	7.8	8.2
Brooklyn Borough	488	9.7	56	59	10.6	47	9.7	10.2
Manhattan Borough	567	16.0	37	47	17.1	60	16.0	16.3
Queens Borough	152	7.2	8	32	9.6	14	7.0	7.7
Richmond Borough	44	14.5	3	58	17.9	3	13.9	15.9
Newark, N. J	93	10.9	6	31	15.5	9	11.9	12.7
Oakland	64	11.7	3	37	13.4	4	11.0	11.3
Oklahoma City	49	13.8	2	36	9.2	5	11.1	10.9
Omaha	44	10.7	3	36	13.5	1	13.5	13.5
Paterson	45	17.0	5	87	14.0	2	12.1	13.4
Philadelphia	471	12.5	35	52	13.7	46	12.5	13.1
Pittsburgh	173	13.4	22	78	13.0	14	13.8	14.8
Portland, Oreg	75	13.0	3	37	9.9	5	12.2	12.7
Providence	76	15.8	10	93	15.0	7	12.9	14.5
Richmond	49	13.9	5	73	17.2	5	14.8	16.2
White	32		2	44		3		
Colored	17	(6)	3	128	(6)	2	(6)	(6)
Rochester	79	11.2	5	44	12.9	3	11.6	12.3
St. Louis	199	12.6	13	45	14.1	15	14.0	14.6
St. Paul	52	10.0	2	20	10.5	4	10.1	10.6
Salt Lake City [5]	38	14.1	2	32	10.9	5	12.6	12.9
San Antonio	64	13.0	2	(3)	18.3	15	14.3	11.7
San Diego	48	16.8	4	84	14.6	3	14.5	15.1
San Francisco	191	15.8	4	27	14.0	10	13.3	13.1
Schenectady	15	8.2	1	31	14.2	3	11.0	12.2
Seattle	101	14.5	6	61	8.3	5	11.0	11.2
Somerville	25	12.6	4	126	12.7	3	9.7	9.3
Spokane	26	11.7	1	26	16.8	1	12.4	12.9
Springfield, Mass	43	14.9	5	86	14.1	4	12.1	12.7
Syracuse	46	11.5	7	86	13.2	6	11.7	12.9
Tacoma	20	9.7	1	27	7.0	1	12.4	11.7
Toledo	73	13.0	6	55	12.7	2	12.7	13.7
Trenton	31	13.2	4	77	21.7	5	16.6	17.1
Utica	39	10.8	2	56	17.9	1	14.5	15.5
Washington, D. C	132	14.1	4	23	15.6	6	15.2	15.4
White	81		2	17		3		
Colored	51	(6)	2	36	(6)	3	(6)	(6)
Waterbury	13	6.7	1	24	6.8	2	9.3	9.3
Wilmington, Del [7]	32	15.9	2	48	12.4	4	14.6	13.8
Worcester	56	14.8	1	14	15.8	6	12.6	12.6
Yonkers	31	11.9	2	48	11.8	6	8.1	9.4
Youngstown	35	10.7	4	57	15.6	7	10.4	12.4

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 73 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930, decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended December 27, 1930, and December 28, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 27, 1930, and December 28, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 27, 1930	Week ended Dec. 28, 1929	Week ended Dec. 27, 1930	Week ended Dec. 28, 1929	Week ended Dec. 27, 1930	Week ended Dec. 28, 1929	Week ended Dec. 27, 1930	Week ended Dec. 28, 1929
New England States:								
Maine	8	-----	3	6	18	4	0	1
New Hampshire	1	4	12	-----	3	14	0	0
Vermont	2	2	-----	-----	-----	41	0	0
Massachusetts	62	103	6	6	273	171	3	2
Rhode Island	8	7	-----	-----	1	1	0	0
Connecticut	11	23	3	3	118	19	0	3
Middle Atlantic States:								
New York	104	157	[1] 25	[1] 28	151	191	6	13
New Jersey	48	132	13	11	120	56	2	4
Pennsylvania	130	-----	-----	-----	406	-----	0	-----
East North Central States:								
Ohio	69	89	7	55	24	351	2	12
Indiana	35	21	1	-----	138	22	4	28
Illinois	146	212	12	24	208	303	7	9
Michigan	16	114	2	3	49	163	1	28
Wisconsin	14	11	41	22	191	485	5	
West North Central States:								
Minnesota	10	24	2	1	24	119	1	5
Iowa	12	10	-----	-----	-----	162	24	1
Missouri	25	34	3	11	656	11	3	5
North Dakota	3	8	-----	-----	-----	98	0	6
South Dakota	13	1	1	-----	5	3	0	1
Nebraska	4	15	2	8	2	174	3	3
Kansas	24	23	1	-----	10	116	1	1
South Atlantic States:								
Delaware	3	1	-----	1	-----	1	0	0
Maryland [2]	39	23	12	19	18	13	0	2
District of Columbia	10	6	2	-----	12	-----	1	0
West Virginia	11	17	16	17	31	90	0	0
North Carolina	23	67	9	12	50	6	1	3
South Carolina	12	27	588	903	-----	-----	1	5
Georgia	23	34	42	148	32	24	0	6
Florida	6	9	1	5	25	7	0	0

[1] New York City only.

[2] Week ended Fridays.

***Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 27, 1930, and December 28, 1929*—Continued**

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 27, 1930	Week ended Dec. 28, 1929	Week ended Dec. 27, 1930	Week ended Dec. 28, 1929	Week ended Dec. 27, 1930	Week ended Dec. 28, 1929	Week ended Dec. 27, 1930	Week ended Dec. 28, 1929
East South Central States:								
Kentucky		20			19	10	1	0
Tennessee	20	14	46	109	24	16	1	6
Alabama	39	19	36	62	122		0	0
Mississippi	22	18					4	1
West South Central States:								
Arkansas	3	8	25	69	1	7	1	1
Louisiana	12	36	10	24		10	0	6
Oklahoma [3]	24	49	41	113	11	19	1	8
Texas	33	112	22	40	81	51	1	2
Mountain States:								
Montana					1	38	0	1
Idaho					10	22	1	5
Wyoming	1	5				3	1	1
Colorado	8	6			43	14	2	4
New Mexico	6	28			121	3	0	0
Arizona	3	11	7	6	28	1	1	3
Utah [2]			15	4	1	66	0	2
Pacific States:								
Washington	11	14			6	15	0	5
Oregon	5	7	27	29	52	11	0	1
California	46	67	57	39	109	203	8	14

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 27, 1930	Week ended Dec. 28, 1929	Week ended Dec. 27, 1930	Week ended Dec. 28, 1929	Week ended Dec. 27, 1930	Week ended Dec. 28, 1929	Week ended Dec. 27, 1930	Week ended Dec. 28, 1929
New England States:								
Maine	3	0	19	38	0	0	2	0
New Hampshire	0	0	2	13	0	0	2	0
Vermont	0	0	4	15	0	6	0	1
Massachusetts	6	1	222	263	0	0	8	2
Rhode Island	0	0	31	23	0	0	0	0
Connecticut	0	1	55	63	0	0	1	0
Middle Atlantic States:								
New York	1	1	436	312	7	3	8	8
New Jersey	0	0	142	161	0	0	5	3
Pennsylvania	1		370		0		19	
East North Central States:								
Ohio	2	3	381	280	45	136	18	15
Indiana	0	1	172	137	53	138	3	0
Illinois	4	1	389	455	53	90	17	3
Michigan	0	3	134	251	12	57	15	1
Wisconsin	1	0	122	92	9	29	2	0
West North Central States:								
Minnesota	3	0	61	98	4	8	2	8
Iowa	2	0	104	43	17	79	0	2
Missouri	0	0	128	57	3	50	4	1
North Dakota	1	1	9	44	2	13	0	0
South Dakota	1	0	6	11	20	14	1	0
Nebraska	2	1	37	64	22	32	1	0
Kansas	2	0	46	127	47	24	1	1
South Atlantic States:								
Delaware	0	0	12	5	0	0	0	0
Maryland [2]	0	0	75	50	0	0	8	7
District of Columbia	1	0	23	25	0	0	2	1
West Virginia	1	0	62	54	13	14	8	8
North Carolina	1	3	22	60	0	11	1	5
South Carolina	1	2	23	32	2	3	5	1
Georgia	0	0	28	42	0	0	6	7
Florida	0	0	8	3	0	2	1	1
East South Central States:								
Kentucky	0	0	43	52	10	31	5	0
Tennessee	0	1	22	20	0	5	5	8
Alabama	2	0	52	29	6	2	12	4
Mississippi	0	0	19	17	5	2	5	7

[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 27, 1930, and December 28, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 27, 1930	Week ended Dec. 28, 1929	Week ended Dec. 27, 1930	Week ended Dec. 28, 1929	Week ended Dec. 27, 1930	Week ended Dec. 28, 1929	Week ended Dec. 27, 1930	Week ended Dec. 28, 1929
West South Central States:								
Arkansas	0	0	9	19	3	16	6	4
Louisiana	1	0	11	20	16	0	9	7
Oklahoma [3]	0	1	55	48	19	137	7	12
Texas	0	0	19	61	12	54	3	2
Mountain States:								
Montana	0	0	24	28	11	10	0	0
Idaho	1	0	1	4	0	7	0	0
Wyoming	1	0	6	6	0	3	0	1
Colorado	0	1	55	28	1	23	1	0
New Mexico	0	0	8	22	0	4	4	0
Arizona	0	0	3	9	0	16	0	1
Utah [2]	0	0	5	14	0	0	0	0
Pacific States:								
Washington	1	1	46	50	13	123	1	6
Oregon	2	0	8	38	9	14	0	1
California	12	1	76	208	21	60	7	4

[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
November, 1930										
Alabama	13	467	200	248	178	30	19	400	3	84
California	15	316	132	2	529	5	146	408	86	58
Colorado	5	72			248		8	136	43	25
Idaho	11	11			30		2	48	10	5
Illinois	23	728	26	5	373		48	1,336	96	70
Louisiana	9	152	53	72	13	23	6	89	8	85
Maryland	2	138	63	1	27	1	6	254	0	93
Minnesota	6	83	4		55		60	244	42	18
Missouri	21	351	28	10	1,290	1	35	511	63	124
Montana	1	11	11		10		3	132	24	6
New Hampshire		22					4	24		2
North Carolina	10	510	28		52	237	4	572	6	34
Oklahoma [1]	7	276	186	125	90	20	2	234	27	150
Oregon	2	18	51		194		3	86	65	21
Rhode Island		44	11		5		1	65	0	7
South Dakota	1	33	36		5	1	21	47	56	13
Texas	2	328	148	537		1	30	164		127
Virginia	9	370	1,298	28	483	21	8	438	12	50
Washington	4	89	23		66		3	180	89	23
Wisconsin	9	80	104		645		24	384	29	23

[1] Exclusive of Oklahoma City and Tulsa.

November, 1930

	Cases
Actinomycosis:	
California	1
Anthrax:	
California	1
Illinois	1
Chicken pox:	
Alabama	176
California	902
Colorado	282
Idaho	33
Illinois	1,694
Louisiana	43
Maryland	294
Minnesota	671
Missouri	405
Montana	280
North Carolina	580
Oklahoma [1]	47
Oregon	223
Rhode Island	76
South Dakota	122
Virginia	492
Washington	305
Wisconsin	1,894
Conjunctivitis:	
Montana	4
Oklahoma [1]	2
Dengue:	
Alabama	2
Diarrhea:	
Maryland	20
Diarrhea and dysentery:	
Virginia	118
Dysentery:	
California (amebic)	2
California (bacillary)	13
Illinois	37
Illinois (amebic)	4
Illinois (bacillary)	2
Louisiana	4
Maryland	21
Minnesota	1
Oklahoma [1]	11
Washington	4
German measles:	
California	36
Colorado	7
Illinois	13
Maryland	4
Montana	3
North Carolina	23
Rhode Island	2
Washington	23
Granuloma, coccidioidal:	
California	1
Hookworm disease:	
Louisiana	81
Impetigo contagiosa:	
Colorado	4
Maryland	22
Oregon	18
Lead poisoning:	
Illinois	2

[1] Exclusive of Oklahoma City and Tulsa.

	Cases
Leprosy:	
California	1
Idaho	1
Louisiana	1
Washington	1
Lethargic encephalitis:	
Alabama	2
California	3
Colorado	2
Illinois	2
Louisiana	3
Texas	1
Wisconsin	1
Mumps:	
Alabama	31
California	617
Colorado	134
Idaho	5
Illinois	757
Louisiana	1
Maryland	31
Missouri	59
Montana	61
Oklahoma [1]	4
Oregon	106
Rhode Island	9
South Dakota	17
Washington	125
Wisconsin	477
Ophthalmia neonatorum:	
California	3
Illinois	48
Maryland	2
Missouri	10
Oklahoma [1]	2
Paratyphoid fever:	
California	3
Illinois	1
Minnesota	8
North Carolina	1
Texas	4
Washington	7
Puerperal septicemia:	
Illinois	4
Washington	1
Rabies in animals:	
California	69
Illinois	1
Louisiana	6
Maryland	2
Missouri	6
Oregon	1
Rhode Island	2
Scabies:	
Maryland	4
Oregon	9
Septic sore throat:	
Illinois	11
Maryland	7
Missouri	14
Montana	1
North Carolina	14
Oklahoma [1]	32
Oregon	3

	Cases
Septic sore throat—Continued.	
Rhode Island	1
South Dakota	4
Tetanus:	
California	8
Illinois	2
Louisiana	5
Oklahoma [1]	1
South Dakota	1
Trachoma:	
California	122
Illinois	1
Maryland	1
Minnesota	1
Missouri	61
Montana	1
Oklahoma	3
South Dakota	1
Trichinosis:	
California	2
Illinois	3
Tularaemia:	
Illinois	9
Louisiana	1
Maryland	1
Minnesota	3
Missouri	3
South Dakota	1
Virginia	6
Wisconsin	2
Typhus fever:	
Alabama	6
Maryland	2

	Cases
Undulant fever:	
California	13
Illinois	5
Louisiana	4
Maryland	6
Minnesota	2
Missouri	10
Oregon	2
Washington	7
Vincent's angina:	
Colorado	3
Illinois	3
Maryland	9
Washington	1
Whooping cough:	
Alabama	79
California	128
Colorado	81
Idaho	38
Illinois	491
Louisiana	24
Maryland	102
Minnesota	99
Missouri	54
Montana	111
North Carolina	370
Oklahoma	21
Oregon	66
Rhode Island	55
South Dakota	29
Virginia	254
Washington	139
Wisconsin	573

[1] Exclusive of Oklahoma City and Tulsa

Cases of Certain Communicable Diseases Reported for the Month of August, 1930, by State Health Officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	12	15	17	74	44	0	77	20	142
New Hampshire		6			6	0		4	
Vermont	19	3	18	16	11	0	[1] 4	2	63
Massachusetts	70	183	227	144	192	0	374	63	551
Rhode Island	5	11	8		13	0	56	6	37
Connecticut	17	24	32	23	31	0	109	6	129
New York	184	237	603	243	234	1	1,656	116	1,418
New Jersey	30	145	165	43	76	0	463	67	272
Pennsylvania	159	183	495	168	232	0	497	206	829
Ohio	157	101	97	61	234	42	578	201	401
Indiana	8	45	25	11	73	116	162	68	109
Illinois	100	258	75	172	235	79	855	173	652
Michigan	79	121	104	72	170	57	420	70	706
Wisconsin	136	51	255	140	108	23	185	32	930
Minnesota	33	48	19		59	11	158	27	101
Iowa	7	12	4	9	27	43	36	8	38
Missouri	25	78	66	29	78	54	217	148	79
North Dakota	4	8	15	34	29	30	14	25	64
South Dakota	7	30	7		10	29	11	19	9
Nebraska	25	19	28	6	17	36	13	20	58
Kansas	15	40	45	25	71	27	75	78	112

[1] Pulmonary.

Cases of Certain Communicable Diseases Reported for the Month of August, 1930, by State Health Officers—Continued

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Delaware		8	13	3	6	0	13	20	4
Maryland	13	41	18	13	34	0	233	240	123
District of Columbia	7	13	26		14	0	80	21	22
Virginia	90	98	208		135	4	190	312	285
West Virginia	15	44	43		58	19	46	245	145
North Carolina	32	244	16		136	11		244	437
South Carolina	46	86	13	22	26	2	135	305	233
Georgia	4	47	45	24	61	3	91	248	75
Florida	5	11	2	22	11	0	38	21	12
Kentucky [2]									
Tennessee	10	43	27	14	76	9	[1] 233	529	115
Alabama	6	51	85	24	80	2	370	186	143
Mississippi	142	61	96	156	26	9	263	161	379
Arkansas	18	5		4	14	12	[1] 13	126	44
Louisiana	1	41	20	6	23	0	[1] 178	154	34
Oklahoma [3]	2	25	47	1	20	43	52	248	32
Texas		99			74			138	
Montana	11	3	14	26	32	11	33	13	87
Idaho	11	7	13	2	8	8	6	8	60
Wyoming	2		2	2	15	0		3	15
Colorado		28	65	61	34	4	114	47	199
New Mexico		32	14	13	6	12	59	28	12
Arizona	2	11	37	9	7	1	118	27	29
Utah [2]									
Nevada	4					0	[1] 5	0	4
Washington	43	20	81	75	44	42	115	21	188
Oregon	24	10	82	55	24	20	37	29	136
California	130	147	305	333	136	46	760	85	377

[1] Pulmonary [2] Reports received weekly. [3] Exclusive of Oklahoma City and Tulsa

Case Rates per 1,000 Population (Annual Basis) for the Month of August, 1930, Based on Provisional Populations

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	0.18	0.22	0.25	1.09	0.65	0.00	1.13	0.29	2.09
New Hampshire		.15			.15	.00		.10	
Vermont	.62	.10	.59	.52	.36	.00	[1] 1.13	.07	2.06
Massachusetts	.19	.51	.63	.40	.58	.00	1.03	.18	1.52
Rhode Island	.09	.19	.14		.22	.00	.96	.10	.63
Connecticut	.12	.18	.23	.17	.23	.00	.80	.04	.94
New York	.17	.22	.56	.23	.22	.00	1.54	.11	1.32
New Jersey	.09	.42	.48	.13	.22	.00	1.35	.19	.70
Pennsylvania	.19	.22	.60	.20	.28	.00	.61	.25	1.01
Ohio	.28	.18	.17	.11	.41	.07	1.02	.36	.71
Indiana	.03	.16	.09	.04	.27	.42	.59	.25	.40
Illinois	.16	.40	.12	.27	.36	.12	1.32	.27	1.01
Michigan	.19	.29	.47	.17	.41	.14	1.02	.17	1.71
Wisconsin	.55	.20	1.02	.56	.43	.09	.74	.13	3.73
Minnesota	.15	.22	.09		.27	.05	.72	.12	.46
Iowa	.03	.06	.02	.04	.13	.21	.17	.04	.18
Missouri	.08	.25	.21	.09	.25	.18	.70	.48	.26
North Dakota	.07	.14	.26	.59	.50	.52	.24	.43	1.10
South Dakota	.12	.51	.12		.17	.49	.19	.32	.15
Nebraska	.21	.16	.24	.05	.14	.31	.11	.17	.49
Kansas	.09	.25	.28	.16	.44	.17	.47	.46	.70
Delaware		.39	.64	.15	.30	.00	.64	1.43	.29
Maryland	.09	.30	.13	.09	.25	.00	1.68	1.73	.80
District of Columbia	.17	.31	.63		.34	.00	1.93	.51	.53
Virginia	.44	.48	1.01		.66	.02	.92	1.52	1.39

[1] Pulmonary.

Case Rates per 1,000 Population (Annual Basis) for the Month of August, 1930, Based on Provisional Populations—Continued

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
West Virginia	.10	.30	.29	-------	.39	.13	.31	1.66	.98
North Carolina	.12	.90	.06	-------	.50	.04	-------	.90	1.62
South Carolina	.31	.58	.09	.15	.18	.01	.92	2 07	1.58
Georgia	.02	.19	.18	.10	.25	.01	.37	1.01	.30
Florida	.04	.09	.02	.18	.09	.00	.30	.17	.10
Kentucky [2]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Tennessee	.05	.19	.12	.06	.34	.04	[1] 1 05	2 38	.52
Alabama	03	.23	.38	.11	.36	.01	1.64	.83	.63
Mississippi	.83	.36	.56	91	.15	.05	1.54	.94	2.22
Arkansas	.11	.03	00	03	.09	.08	[1] 08	.80	.28
Louisiana	.01	.23	.11	03	13	.00	[1] 1.00	86	.19
Oklahoma [3]	.01	.14	.27	.01	.16	.24	.30	1 41	.18
Texas	-------	20	-------	-------	.15	-------	-------	.28	-------
Montana	.24	07	31	57	.70	.24	.72	29	1 91
Idaho	.29	18	.34	.05	.21	21	16	21	1.58
Wyoming	.10	-------	.10	.10	.78	00	-------	16	.78
Colorado	-------	.32	.74	69	.39	05	1 20	53	2.26
New Mexico	-------	.88	.38	.36	.16	.33	1 62	77	.33
Arizona	.05	.30	.99	.24	19	03	3 17	.73	.78
Utah [2]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Nevada	.52	-------	-------	-------	-------	00	[1] 64	00	.52
Washington	.32	.22	.61	.56	33	32	86	.16	1.41
Oregon	.30	.23	1.01	.68	30	25	.46	.36	1.67
California	.27	.30	.63	69	28	.09	1 56	17	.78

[1] Pulmonary [2] Reports received weekly. [3] Exclusive of Oklahoma City and Tulsa.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 94 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 31,690,000. The estimated population of the 87 cities reporting deaths is more than 30,100,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended December 20, 1930, and December 21, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,483	1,756	-------
94 cities	584	767	1,066
Measles:			
45 States	3,470	3,846	-------
94 cities	1,181	663	-------
Meningococcus meningitis:			
46 States	73	165	-------
94 cities	39	100	-------
Poliomyelitis:			
46 States	91	24	-------
Scarlet fever:			
46 States	3,908	3,887	-------
94 cities	1,435	1,500	1,206
Smallpox:			
46 States	634	1,067	-------
94 cities	57	142	37
Typhoid fever:			
46 States	314	207	-------
94 cities	53	32	30
Deaths reported			
Influenza and pneumonia:			
87 cities	723	1,009	-------
Smallpox:			
87 cities	0	0	-------

City reports for week ended December 20, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	2	1	0	1	1	0	0	2
New Hampshire:								
Concord	0	0	0		0	0	0	2
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	4	0	0		0	0	0	0
Massachusetts:								
Boston	56	41	33	1	0	59	13	25
Fall River	22	4	6		0	0	5	3
Springfield	14	5	0		0	3	5	2
Worcester	38	6	6		0	1	0	2
Rhode Island:								
Pawtucket	1	1	4		0	0	0	2
Providence	9	10	5		0	0	0	4
Connecticut:								
Bridgeport	3	7	0		0	1	3	2
Hartford		8						
New Haven	8	2	0		0	8	8	1
MIDDLE ATLANTIC								
New York:								
Buffalo	35	18	16		2	6	38	16
New York	180	195	71	23	5	98	35	154
Rochester	13	8	7		0	1	2	5
Syracuse	20	4	0		0	2	0	3
New Jersey:								
Camden	4	6	1		0	53	7	4
Newark	70	23	7	3	0	0	6	17
Trenton	7	3	0		0	0	2	2
Pennsylvania:								
Philadelphia	110	71	16	5	2	16	28	49
Pittsburgh	73	23	18		1	10	17	28
Reading	12	3	0		0	5	23	1
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	6	14	1		4	10	15	10
Cleveland	170	44	14	7	0	2	72	12
Columbus	3	8	2	1	1	1	1	8
Toledo	110	10	10	3	3	2	7	2
Indiana:								
Fort Wayne	2	5	1		1	1	0	3
Indianapolis	19	10	3		0	0	0	12
South Bend	4	1	0		0	0	0	2
Terre Haute	3	1	0		0	1	0	2
Illinois:								
Chicago	105	132	122	4	7	11	60	30
Springfield	3	3	2		0	0	0	1
Michigan:								
Detroit	97	67	33	1	3	8	18	20
Flint	26	4	0		0	5	1	1
Grand Rapids		1						

City reports for week ended December 20, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	32	1	0	----	0	0	7	0
Madison	48	2	2	----	----	1	10	----
Milwaukee	132	20	9	----	0	5	68	9
Racine	55	3	0	----	0	0	0	0
Superior	5	0	0	----	0	1	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	7	1	0	----	0	0	1	1
Minneapolis	56	20	11	----	0	1	10	4
St. Paul	32	12	0	2	2	0	0	5
Iowa:								
Davenport	2	0	0	----	----	0	0	----
Des Moines	1	3	0	----	----	0	0	----
Sioux City	7	1	0	----	----	1	4	----
Waterloo	10	0	0	----	----	0	0	----
Missouri:								
Kansas City	32	8	3	----	2	3	0	2
St. Joseph	0	2	0	----	0	1	0	5
St. Louis	35	43	23	----	----	724	11	----
North Dakota:								
Fargo	9	0	0	----	0	0	5	0
Grand Forks	0	0	0	----	----	0	9	----
South Dakota:								
Aberdeen	3	0	0	----	----	1	2	----
Nebraska:								
Omaha	12	7	8	----	0	0	0	6
Kansas:								
Topeka	6	2	0	1	1	1	0	2
Wichita	6	3	1	----	0	0	0	7
SOUTH ATLANTIC								
Delaware:								
Wilmington	3	1	1	----	0	1	0	3
Maryland:								
Baltimore	105	30	13	9	1	20	7	23
Cumberland	0	1	0	----	0	0	0	0
Frederick	0	0	1	----	0	0	0	0
District of Columbia:								
Washington	17	17	13	1	1	16	0	8
Virginia:								
Lynchburg	3	3	1	----	0	1	1	0
Norfolk	8	3	0	----	0	0	0	2
Richmond	2	9	4	----	0	7	4	3
Roanoke	10	3	2	----	1	0	0	2
West Virginia:								
Charleston	3	1	0	1	1	0	6	1
Wheeling	10	2	0	----	0	0	0	0
North Carolina:								
Raleigh	----	1	----	----	----	----	----	----
Wilmington	2	1	1	----	0	0	0	2
Winston-Salem	6	2	1	----	0	0	1	3
South Carolina:								
Charleston	0	1	1	35	0	0	0	6
Columbia	20	1	1	----	0	3	10	10
Georgia:								
Atlanta	3	5	4	18	2	10	0	8
Brunswick	0	0	0	----	1	0	0	0
Savannah	0	1	1	12	3	0	1	0
Florida:								
Miami	2	3	3	----	0	0	2	1
St. Petersburg	----	0	----	----	0	----	----	1
Tampa	0	2	5	----	0	2	0	0

City reports for week ended December 20, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	1	1	1		0	0	2	0
Tennessee:								
Memphis	19	6	6		3	0	0	9
Nashville	3	2	3		0	4	0	7
Alabama:								
Birmingham	12	5	3	6	1	42	0	1
Mobile	0	1	1		1	0	0	0
Montgomery	1	2	0			0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	1	2	0			1	0	
Little Rock	5	2	0		0	0	0	1
Louisiana:								
New Orleans	1	13	17	2	4	1	0	19
Shreveport		2						
Oklahoma:								
Muskogee	6	2	2		0	1	0	0
Oklahoma City	0	3	3	5	0	0	0	7
Tulsa	8	4	5			7	1	
Texas:								
Dallas	26	11	15	1	0	3	7	4
Fort Worth	10	5	1		2	0	0	6
Galveston	2	1	7		0	0	0	0
Houston	0	7	10		0	0	0	6
San Antonio	1	5	6		2	0	0	6
MOUNTAIN								
Montana:								
Billings	2	0	0		0	0	0	0
Great Falls	6	0	0		0	0	0	0
Helena	10	0	0		0	0	0	0
Missoula	0	1	0		0	0	0	0
Idaho:								
Boise	3	1	0		0	0	0	2
Colorado:								
Denver	34	8	0		2	7	3	16
Pueblo	2	1	0		0	10	0	1
New Mexico:								
Albuquerque	17	0	1		0	0	1	1
Arizona:								
Phoenix	0	0	0		0	0	0	3
Utah:								
Salt Lake City	20	4	2		0	2	3	6
Nevada:								
Reno	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	19	5	18			0	20	
Spokane	1	2	0			0	0	
Tacoma	8	3	4		0	0	1	2
Oregon:								
Portland	27	11	0		0	2	10	8
Salem	0	0	0		0	1	1	0
California:								
Los Angeles	16	40	14	41	4	2	8	36
Sacramento	9	2	1		0	0	7	6
San Francisco	14	17	4		0	1	4	7

City reports for week ended December 20, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	2	5	0	0	0	1	0	1	0	8	19
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	10
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	1
Burlington	1	0	0	0	0	0	0	0	0	0	5
Massachusetts:											
Boston	70	53	0	0	0	7	1	1	0	27	194
Fall River	2	8	0	0	0	3	0	0	0	1	29
Springfield	8	12	0	0	0	2	0	1	1	7	37
Worcester	11	13	0	0	0	3	0	0	0	1	56
Rhode Island											
Pawtucket	1	8	0	0	0	0	0	0	0	1	15
Providence	8	15	0	0	0	2	0	0	0	7	76
Connecticut											
Bridgeport	9	12	0	0	0	2	0	0	0	2	34
Hartford	6		0				0				
New Haven	5	4	0	0	0	2	0	1	0	3	36
MIDDLE ATLANTIC											
New York:											
Buffalo	26	25	0	0	0	11	1	0	0	31	137
New York	192	164	0	0	0	103	9	5	1	134	1,449
Rochester	7	50	0	0	0	5	0	0	0	14	69
Syracuse	12	10	0	0	0	0	0	0	0	10	46
New Jersey.											
Camden	4	7	0	0	0	0	0	0	0	6	22
Newark	17	23	0	0	0	5	1	0	0	17	96
Trenton	4	10	0	0	0	0	0	0	0	0	31
Pennsylvania.											
Philadelphia	80	113	0	0	0	28	2	2	1	28	471
Pittsburgh	36	55	0	0	0	11	1	0	0	14	173
Reading	2	2	0	0	0	2	0	0	0	0	28
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	16	35	1	0	0	5	0	4	0	8	132
Cleveland	37	83	1	0	0	12	0	2	0	17	160
Columbus	11	7	1	0	0	2	0	0	0	0	76
Toledo	13	11	1	1	0	6	1	0	0	3	74
Indiana											
Fort Wayne	3	1	0	0	0	0	0	2	0	0	
Indianapolis	10	52	5	5	0	4	0	2	1	8	
South Bend	3	6	1	0	0	0	0	0	0	2	24
Terre Haute	3	0	0	0	0	0	0	0	0	0	17
Illinois											
Chicago	115	183	1	0	0	34	2	5	0	64	644
Springfield	1	6	0	1	0	0	0	0	0	0	12
Michigan											
Detroit	94	55	1	4	0	26	1	0	0	46	262
Flint	12	20	1	0	0	1	0	0	0	0	20
Grand Rapids	11		0				0				
Wisconsin											
Kenosha	2	1	0	0		0	0	0	0	0	8
Madison	2	6	0	0			0	0		0	
Milwaukee	28	18	0	0	0	7	0	0	0	12	119
Racine	6	3	0	0	0	3	0	0	0	2	14
Superior	3	0	0	0	0	0	0	0	0	5	9
WEST NORTH CENTRAL											
Minnesota:											
Duluth	10	1	0	0	0	1	0	0	0	0	23
Minneapolis	50	13	1	0	0	2	0	0	0	9	95
St. Paul	27	4	2	0	0	0	0	0	0	11	57

City reports for week ended December 20, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—contd.											
Iowa											
Davenport	1	2	1	6	------	------	0	0	------	0	------
Des Moines	10	9	1	3	------	------	0	0	------	0	29
Sioux City	2	19	1	0	------	------	0	0	------	0	------
Waterloo	2	0	1	2	------	------	0	0	------	7	------
Missouri											
Kansas City	15	10	1	0	0	4	0	0	0	5	96
St. Joseph	4	5	0	0	0	0	0	0	0	0	20
St. Louis	33	76	0	0	0	9	1	4	0	6	199
North Dakota											
Fargo	1	0	0	0	0	0	0	0	0	0	5
Grand Forks	1	0	0	0	------	------	0	0	------	0	------
South Dakota											
Aberdeen	0	0	0	0	------	------	0	0	------	0	------
Nebraska											
Omaha	5	11	1	16	0	2	0	0	0	1	44
Kansas											
Topeka	2	0	0	0	0	2	0	0	0	0	18
Wichita	5	5	0	7	0	0	0	0	1	3	47
SOUTH ATLANTIC											
Delaware											
Wilmington	2	4	0	0	0	2	0	0	0	2	32
Maryland											
Baltimore	28	34	0	0	0	17	2	2	0	2	188
Cumberland	1	2	0	0	0	0	0	0	0	0	9
Frederick	0	0	0	0	0	0	0	0	0	0	5
District of Columbia											
Washington	23	22	0	0	0	14	1	2	0	0	132
Virginia											
Lynchburg	0	0	0	0	0	0	0	0	0	0	6
Norfolk	1	1	0	0	0	2	0	0	0	0	------
Richmond	7	8	0	0	0	2	1	0	0	1	46
Roanoke	3	1	0	0	0	1	0	0	0	0	13
West Virginia											
Charleston	1	0	0	0	0	1	0	1	0	0	20
Wheeling	2	3	0	0	0	1	0	0	0	0	15
North Carolina											
Raleigh	0		0				0			------	------
Wilmington	1	2	0	0	0	0	0	0	0	3	12
Winston-Salem	2	1	0	0	0	3	0	0	0	0	16
South Carolina											
Charleston	0	0	0	0	0	0	0	0	0	0	24
Columbia	1	2	0	0	0	3	0	0	0	0	31
Georgia											
Atlanta	5	19	0	0	0	5	0	0	0	4	85
Brunswick	0	0	0	0	0	0	0	0	0	0	6
Savannah	1	3	1	0	0	1	0	0	0	0	30
Florida											
Miami	2	1	0	0	0	1	0	0	0	0	32
St. Petersburg	0		0		0	0	0	------	0	------	10
Tampa	1	3	0	0	0	1	0	1	0	0	28
EAST SOUTH CENTRAL											
Kentucky											
Covington	2	6	------	0	0	0	0	0	1	0	19
Tennessee											
Memphis	6	17	0	0	0	6	0	5	0	0	90
Nashville	3	0	0	0	0	0	0	1	1	0	46
Alabama											
Birmingham	4	6	1	0	0	7	1	0	0	0	61
Mobile	1	3	0	0	0	0	0	0	0	0	24
Montgomery	1	1	0	0			0	0	------	1	------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0	------	------	0	0	------	3	------
Little Rock	2	0	0	0	0	1	0	0	0	0	------

City reports for week ended December 20, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL—con.											
Louisiana											
New Orleans	8	12	0	0	0	11	2	7	2	1	149
Shreveport	1	------	0	------	------	------	0	------	------	------	------
Oklahoma											
Muskogee	1	0	0	0	0	0	0	0	0	0	------
Oklahoma City	2	6	0	2	0	4	0	0	0	0	49
Tulsa	2	7	1	5	------	------	0	1	------	0	------
Texas:											
Dallas	7	3	1	0	0	6	1	0	0	14	58
Fort Worth	3	3	1	5	0	2	0	0	0	0	55
Galveston	1	0	0	0	0	0	0	0	0	0	8
Houston	3	5	1	4	0	3	0	0	0	0	58
San Antonio	2	0	0	0	0	7	0	0	0	0	64
MOUNTAIN											
Montana											
Billings	1	0	0	11	0	1	0	0	0	3	6
Great Falls	2	8	0	0	0	0	0	0	0	8	7
Helena	1	0	0	2	0	0	0	0	0	0	5
Missoula	1	0	0	0	0	0	0	0	0	1	1
Idaho											
Boise	0	1	1	0	0	0	0	0	0	4	10
Colorado											
Denver	13	18	0	0	0	0	0	0	5	15	94
Pueblo	2	1	0	0	0	2	0	0	0	7	7
New Mexico											
Albuquerque	0	1	0	0	0	0	0	0	0	0	6
Arizona											
Phoenix	1	0	0	0	0	4	0	0	0	0	17
Utah											
Salt Lake City	2	6	1	0	0	3	0	1	0	11	38
Nevada											
Reno	0	0	0	0	0	1	0	0	0	0	9
PACIFIC											
Washington:											
Seattle	8	11	1	0	------	------	1	1	------	11	------
Spokane	8	5	4	3	------	------	0	0	------	0	------
Tacoma	3	7	4	2	------	0	0	0	0	2	20
Oregon											
Portland	7	2	7	0	0	3	0	0	0	1	75
Salem	0	2	0	0	0	0	0	0	0	0	------
California											
Los Angeles	32	14	1	0	0	31	1	0	1	8	304
Sacramento	2	0	0	0	0	1	0	1	0	0	------
San Francisco	17	4	2	0	0	9	1	1	0	13	188

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Massachusetts									
Boston	0	0	0	0	0	0	0	2	0
Worcester	1	1	0	0	0	0	0	3	0
MIDDLE ATLANTIC									
New York:									
New York [1]	7	2	0	0	0	0	1	0	0
Rochester	1	0	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	2	0	0	0	0	0	0	0	0

[1] Typhus fever: 3 cases; 1 case at New York City, N. Y.; 1 case at Savannah, Ga.; and 1 case at Dallas, Tex.

City reports for week ended December 20, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio									
Cincinnati	0	0	0	0	0	0	0	0	1
Cleveland	3	1	0	0	0	0	0	0	0
Indiana									
Indianapolis	0	1	0	0	0	0	0	0	0
Illinois									
Chicago	4	0	0	0	0	0	0	1	0
Michigan									
Detroit	6	2	0	0	0	0	0	0	0
Wisconsin									
Milwaukee	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL									
Minnesota									
Minneapolis	0	0	0	0	0	0	0	3	0
St Paul	0	0	0	0	0	0	0	1	0
Iowa									
Des Moines	1	0	0	0	0	0	0	0	0
Waterloo	1	0	0	0	0	0	0	0	0
Missouri.									
Kansas City	1	1	0	0	0	0	0	1	0
St. Joseph	1	0	0	0	0	0	0	0	0
St. Louis	3	2	0	0	0	0	0	0	0
SOUTH ATLANTIC									
Delaware									
Wilmington	1	0	0	0	0	0	0	0	0
Maryland									
Baltimore	1	0	0	0	0	0	0	0	0
District of Columbia									
Washington	0	1	0	0	0	0	0	1	0
Virginia									
Norfolk	0	0	0	0	0	0	0	1	0
South Carolina									
Charleston	1	0	0	0	0	0	0	0	0
Columbia	0	0	0	0	0	2	0	0	0
Georgia [1]									
Atlanta	1	1	0	0	0	0	0	0	0
EAST SOUTH CENTRAL									
Tennessee									
Memphis	1	2	0	0	0	0	0	0	0
WEST SOUTH CENTRAL									
Arkansas									
Little Rock	0	0	0	0	0	1	0	0	0
Louisiana									
New Orleans	1	1	0	0	2	2	0	0	0
Oklahoma									
Oklahoma City	0	0	0	0	0	0	0	1	0
Texas.									
Dallas [1]	0	0	0	0	1	1	0	0	0
Fort Worth	1	0	0	0	0	0	0	0	0
MOUNTAIN									
Montana									
Missoula	1	0	0	0	0	0	0	0	0
Arizona:									
Phoenix	0	2	0	0	0	0	0	0	0
Utah									
Salt Lake	2	0	0	0	0	0	0	0	0
PACIFIC									
California:									
Los Angeles	0	0	0	0	2	0	0	0	0
Sacramento	1	0	0	0	0	0	0	1	0
San Francisco	1	0	0	0	0	0	0	6	1

[1] Typhus fever: 3 cases, 1 case at New York City, N. Y.; 1 case at Savannah, Ga.; and 1 case at Dallas, Tex.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended December 20, 1930, compared with those for a like period ended December 21, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities November 16 to December 20, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929
98 cities	102	[2] 186	89	139	[3] 92	146	[4] 90	134	[5] [illegible]6	128
New England	113	117	80	177	111	112	117	117	[6] 130	168
Middle Atlantic	54	123	50	123	61	110	50	112	65	106
East North Central	125	302	123	167	113	191	[7] 122	170	[8] 120	167
West North Central	108	169	108	114	99	121	95	148	87	110
South Atlantic	141	135	60	144	[9] 104	127	[9] 113	107	[9] 91	107
East South Central	310	239	155	157	162	226	155	137	94	123
West South Central	183	146	164	25[illegible]	[10] 15[illegible]	362	[11] 147	2[illegible]3	[10] 219	225
Mountain	26	[2] 89	77	17	[12] 0	157	26	61	17	61
Pacific	73	60	111	56	76	84	64	58	97	56

MEASLES CASE RATES

	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929
98 cities	129	[2] 72	109	74	[3] 146	98	[4] 167	113	[5] 194	109
New England	164	56	118	70	202	81	250	85	[6] 173	92
Middle Atlantic	80	34	73	33	89	54	89	47	91	59
East North Central	31	94	28	101	28	93	[7] 27	133	[8] 29	94
West North Central	751	81	636	100	933	216	1,055	202	1,387	210
South Atlantic	59	24	40	22	[9] 57	4	[9] 74	28	[9] 128	39
East South Central	169	14	74	0	175	14	337	14	310	0
West South Central	4	27	11	38	[10] 12	46	[11] 8	61	[10] 20	133
Mountain	318	[2] 107	275	131	[12] 51	165	146	104	163	139
Pacific	33	280	12	219	31	377	31	464	7	418

SCARLET FEVER CASE RATES

	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929
98 cities	200	[2] 218	178	212	[3] 207	252	[4] 229	277	[5] 236	249
New England	217	249	241	258	246	276	237	375	[6] 312	310
Middle Atlantic	168	127	156	116	187	148	196	172	219	176
East North Central	266	347	224	361	259	409	[7] 318	438	[8] 300	355
West North Central	214	223	137	183	194	231	205	271	273	235
South Atlantic	198	163	172	139	[9] 211	159	[9] 241	193	[9] 193	253
East South Central	236	157	243	137	337	144	425	89	223	48
West South Central	101	156	142	118	[10] 100	156	[11] 94	137	[1] [illegible]80	99
Mountain	275	[2] 267	223	348	[12] 120	392	206	322	292	583
Pacific	102	261	97	266	113	355	83	340	97	244

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930, and 1929, respectively.
[2] Reno, Nev., not included.
[3] Raleigh, N. C., Shreveport, La., and Denver, Colo., not included.
[4] South Bend, Ind., Raleigh, N. C., Fort Smith, Ark., and Shreveport, La., not included.
[5] Hartford, Conn., Grand Rapids, Mich., Raleigh, N. C., and Shreveport, La., not included.
[6] Hartford, Conn., not included.
[7] South Bend, Ind., not included.
[8] Grand Rapids, Mich., not included.
[9] Raleigh, N. C., not included.
[10] Shreveport, La., not included.
[11] Fort Smith, Ark., and Shreveport, La., not included.
[12] Denver, Colo., not included.

Summary of weekly reports from cities November 16 to December 20, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

SMALLPOX CASE RATES

	Week ended—									
	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929
98 cities	3	[2] 24	8	14	[3] 7	19	[4] 15	23	[5] 9	23
New England	0	0	0	0	0	0	0	2	[6] 0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	0	33	4	13	1	26	[7] 3	29	[8] 6	31
West North Central	33	50	66	48	47	64	120	56	47	60
South Atlantic	0	2	0	0	[9] 0	0	[9] 0	0	[9] 0	0
East South Central	0	0	0	0	0	0	0	0	0	7
West South Central	4	38	4	11	[10] 4	19	[11] 8	34	[10] 16	34
Mountain	43	[2] 71	34	35	[12] 205	78	146	78	112	52
Pacific	7	111	9	75	12	60	7	118	12	113

TYPHOID FEVER CASE RATES

	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929
98 cities	15	[2] 13	10	5	[3] 10	5	[4] 8	6	[5] 9	5
New England	15	11	11	2	7	2	18	7	[6] 10	0
Middle Atlantic	5	10	3	2	8	4	7	6	3	4
East North Central	9	9	4	5	10	4	[7] 7	3	[8] 10	3
West North Central	23	12	8	6	6	2	6	6	8	8
South Atlantic	26	19	29	4	[9] 17	6	[9] 4	7	[9] 11	4
East South Central	13	34	13	34	13	48	20	14	40	0
West South Central	90	34	75	15	[10] 28	0	[11] 25	8	[10] 28	38
Mountain	51	[2] 36	9	26	[12] 17	26	0	9	9	17
Pacific	12	5	7	2	12	10	7	7	7	2

INFLUENZA DEATH RATES

	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929
91 cities	11	[2] 8	9	11	[3] 10	17	[13] 10	16	[5] 10	19
New England	7	4	2	4	4	11	4	7	[6] 2	9
Middle Atlantic	8	9	11	5	6	14	8	9	5	18
East North Central	5	6	7	10	8	9	[7] 5	15	[8] 10	14
West North Central	6	9	0	21	12	27	21	12	15	15
South Atlantic	22	4	9	17	[9] 19	28	[9] 22	19	[9] 19	13
East South Central	15	30	29	15	15	60	29	60	37	52
West South Central	38	16	15	55	[10] 37	47	[10] 12	78	[10] 25	66
Mountain	60	[2] 9	26	17	[12] 34	17	9	0	17	26
Pacific	9	6	9	13	3	13	9	19	12	28

PNEUMONIA DEATH RATES

	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929
91 cities	119	[2] 101	112	106	[3] 102	136	[13] 108	150	[5] 115	158
New England	115	88	71	92	66	74	109	135	[6] 108	157
Middle Atlantic	140	106	125	101	107	139	109	156	133	165
East North Central	83	96	78	84	78	126	[7] 85	116	[8] 70	117
West North Central	136	102	92	126	130	126	145	174	95	180
South Atlantic	143	94	165	129	[9] 143	131	[9] 121	191	[9] 128	184
East South Central	199	254	155	224	177	239	140	216	125	216
West South Central	123	129	165	156	[10] 139	238	[10] 176	230	[10] 147	234
Mountain	163	[2] 107	223	157	[12] 137	165	154	192	215	235
Pacific	61	28	86	104	74	138	74	107	156	138

[2] Reno, Nev., not included
[3] Raleigh, N. C., Shreveport, La., and Denver, Colo , not included.
[4] South Bend, Ind., Raleigh, N. C., Fort Smith, Ark., and Shreveport, La , not included.
[5] Hartford, Conn , Grand Rapids, Mich, Raleigh, N. C., and Shreveport, La., not included.
[6] Hartford, Conn., not included.
[7] South Bend, Ind., not included.
[8] Grand Rapids, Mich., not included.
[9] Raleigh, N. C., not included.
[10] Shreveport, La., not included.
[12] Denver, Colo., not included.
[13] South Bend, Ind., Raleigh, N. C., and Shreveport, La., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended December 20, 1930.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended December 20, 1930, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia [1]					
New Brunswick					7
Quebec		5	1		11
Ontario			2	1	10
Manitoba	1				1
Saskatchewan			4		1
Alberta			1		
British Columbia					6
Total	1	5	8	1	36

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended December 20, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended December 20, 1930, as follows:

Disease	Cases	Disease	Cases
Chicken pox	194	Mumps	27
Diphtheria	66	Paratyphoid fever	1
Erysipelas	8	Scarlet fever	94
German measles	2	Tuberculosis	46
Influenza	5	Typhoid fever	11
Measles	56	Whooping cough	31

JAMAICA

Communicable diseases—Four weeks ended December 6, 1930.—During the four weeks ended December 6, 1930, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the Island of Jamaica outside of Kingston as follows:

Disease	Cases		Disease	Cases	
	Kingston	Other localities		Kingston	Other localities
Cerebrospinal meningitis		1	Poliomyelitis		2
Chicken pox	1	4	Scarlet fever	1	1
Dysentery	1	3	Tuberculosis	43	66
Erysipelas	1	1	Typhoid fever	20	48
Leprosy	1	1			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		June 29–July 26, 1930	July 27–Aug 23, 1930	Aug. 24–Sept 20, 1930	Week ended— Sept 27, 1930	October, 1930 4	October, 1930 11	October, 1930 18	October, 1930 25	November, 1930 1	November, 1930 8	November, 1930 15	November, 1930 22	November, 1930 29	December, 1930 6	December, 1930 13	December, 1930 20	December, 1930 27
Afghanistan	C	P	P															
China.																		
Amoy	C			2														
	D			2														
Canton	C	2				1			1									
	D	1																
Shanghai	C			34	23	5	6	4	1		1							
	D			3	2			2										
Shensi Province	C			P														
Swatow	C		3	2														
Tientsin	C		2	1														
India	C	26,121	42,893	51,551	11,109	10,172	7,863											
	D	13,822	22,358	23,959	5,225	4,808	3,928											
Bassein	C			1														
Bombay	C		14	1	1	3	1	11	17	1	1		2	2	4			
	D		8	2	1	2		8	10	6	1		2	1	1			
Calcutta	C	220	63	27	4	4	7	9	7	7	11	8	4	6	2			
	D	128	30	12	3	4	4	4	4	2	6	4	4	4	1			
Madras	C		1				2			1								
	D		1				2											
Rangoon	C	1	1	2			1											
	D	1	1	1			1											
Tuticorin	C							1				1	4					
	D							1				1						
India (French).																		
Chandernagor	C	1		1		1	2							1				
	D					1												
Pondicherry	C						1						1	1	1	1		
	D						1						1	1	1	1		
India (Portuguese)	C		1	1						3	9	2						
	D			1						3	5	1						

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		June 29–July 26, 1930	July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27
Indo-China (see also table below):																		
Pnompenh	C	32	11		1		1		1					1	1			
	D	22	6											1	1			
Saigon and Cholon	C	10	5		1	1			1					1				
	D	3	1											1				
Philippine Islands:[1]																		
Ports—																		
Cebu	C	65	9	2														
	D	36	8	2														
Iloilo	C	29	64	10	1									1				
	D	22	56	14	2			2						3				
Manila	C		1	43	2	1	2											
	D			12		1												
Provinces—																		
Antique	C		20	47	12		28											
	D		12	34	8		10											
Bohol	C		138	49														
	D		79	20														
Bulacan	C	4	1	4		2												
	D			2		1												
Capiz	C	3	2	1														
	D	2	2															
Cebu	C	713	85	25														
	D	303	50	11														
Iloilo	C	309	571	238	18	7	13	12	10	10	4	6	11	21	13		7	5
	D	193	376	151	15	6	7	12	7	7	3	6	8	11	8		6	4
La Union	C	1																
Leyte	C	1																
	D	11																
Masbate	C	92	34															
	D	35	14															
Misamis, Occidental	C	3																
	D	3																
Negros, Occidental	C	568	343	122	8	10	5	5	12	3	19	22	44	38	48	33	28	19
	D	368	237	91	6	5	6	3	12	3	12	14	33	17	45	28	22	16

Negros, Oriental	C	23	8															
	D	13	4															
Nueva Ecija	C	1																
	D	1																
Pampanga	C	2		1														
Pangasinan	C	3	1															
	D	2	1															
Rizal	C	1																
	D										4							
Samar	C		18	4	4			3	6	3	4	3	4	4			2	
	D		16	2	4			3	5	1	4	2	4	4			1	1
Sorsogon	C										5							
	D	1									4							
Surigao	C		28	1	(2)													
	D		17	2														
Tarlac	C		1															
Siam	C	20	3				1	3	3		1			1	1			
	D	9	2					1	3		1				1			
Bangkok	C	8	1				1	2	1	2			2	1				
	D	3	1				1	1	1	1			2	1				
Songkla	C	10																
	D	6																
On vessel S S Malwa from Shanghai	D			1														

Place		May, 1930	June, 1930	July, 1930	August, 1930			September, 1930			October, 1930			November, 1930	
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Indo-China (French) (see also table above)															
Annam [1]	C	23	16	1		3									
Cambodia [1]	C	85	144	43	37	22		23	13	2	16		6		1
Cochin-China [3]	C	671	273	46	22	5		9	6	18	14	6	8		5

[1] Figures for cholera in the Philippine Islands are subject to correction.
[2] During the period from Aug 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, P. I.
[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		June 29–July 26, 1930	July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930 4	11	18	25	November, 1930 1	8	15	22	29	December, 1930 6	13	20	27
Algeria:																		
Algiers	C	3	7	11	1	1	2	2	5	3	1	2			1			
	D								3									
Constantine	C	1									1							
Oran	C	3	4	10		4	4	2	1			1						
	D			1			2	1										
Plague-infected rats		2		10	2			4	1									
Philippeville	C			1	1		1	1	1		1							
Argentina: Cordoba Province—Chazon	C															1		
Belgian Congo	C	2	2	5								1						
	D	2	2	3								1						
British East Africa (see also table below): Uganda	C	228	236	202	65	18	32	50	53									
	D	213	229	191	65	18	32	49	53									
Canary Islands: Las Palmas	D		1															
Ceylon:																		
Colombo	C	3	2	2	1	1		1				1	1		4			
	D	3	2	3	1	1		1				1	1		3			
Plague-infected rats		1										1	1	1				
China:																		
Manchuria—Tunghau and Nungan	C		30	29	2													
Shensi	C			P					P									
Dutch East Indies:																		
Batavia and West Java	C	84	83	79	22	14	26	45	41	36	27							
	D	84	83	76	22	14	26	41	42	37	28							
Plague-infected rats			1	3														
Java and Madura	D	217	188	200	75	68	95	97	124	140	107	130						
Ecuador (see table below).																		
Egypt:																		
Alexandria	C	23	11	10	2	1	3	3	2	1	1	3		1		2	1	
	D	10	6	8	3	1	1	1	3		2	2				1		
Assiout	C	2									3			2		7	5	1
	D	2									1					1		
Aswan	C													3				
Beni-Suef	C		1															

Gharbieh	C		3															
	D		1															
Girga	C	1		1													3	1
	D																	1
Minieh	C	3														1		
Port Said	C	1	1						1	1								
France:																		
Marseille	C			5				4	2	1		1						
St. Ouen	C	1																
	D	1																
Gambia	C		4															
	D		4															
Greece (see also table below)																		
Patras	C	1																
Pyrgos	C					2												
India	C	377	877	2,497	672	527	627											
	D	256	477	1,132	289	222	269											
Bassein	C			2						1								
	D			3														
Bombay	C	1		1	1			1	1									
	D	1		1		1		1		1								
Plague-infected rats		52	35	47	21	13	16	14	2	9	11	8	11	5	12			
Madras Presidency	C	47	81	127	41	59	46	50	69	31								
	D	31	34	57	11	32	31	33	43	22								
Rangoon	C	2	3	10	2					1		1						
	D	2	2	9	2					1								
Plague-infected rats		6	7	8		1			1				1	1				
India (Portuguese)	D		P							3								
Indo-China (see also table below)																		
Pnompenh	C	2	4	3	1	1							1	3	1			
	D	2			1	1	1		1				1	3	1			
Saigon and Cholon	C		1	1	1													
Iraq: Baghdad	C	18	9		1							P	2					
	D	7	3		1								1					
Kwang-Chow-Wan	C	4	1															
Madagascar (see also table below) Tamatave	C	1	2	1		1			3		2			2	1			
	D					1			3					2				
Morocco	C	1	15						4		1							
	D		2															
Nigeria: Lagos	C	1	7	6		3		2	33	1	2	2	4	3	2			
	D	1	7	6		3		2		1	2	2	4	3	2			
Plague-infected rats		18	8	10				11	3	1	2							
Senegal (see table below)																		
Siam	C		7	3			1		3	1	1							1
	D		6	2					3	1								1
Bangkok	C		3													1		
	D		2													1		
Nagara Rajsima	C		2	1				1				1						
	D		2	1				1				1				8		
Syria: Beirut	C	9	2	5					1	1	3	1						
Tripolitania	C		2										4	6	2			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases, D, deaths, P, present]

Place		June 22–July 26, 1930	July 27–Aug 23, 1930	Aug 24–Sept 20, 1930	Week ended— Sept 27, 1930	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27
Tunisia:																		
Sfax district	C	6	1															
Tunis	C	5								1		1				P		
	D	1																
Union of Socialist Soviet Republics: Salsk Region	C	7	7															
	D	4	5															
Union of South Africa:																		
Cape Province	C	1	1	1					1									
	D	1	1	1														
Orange Free State	C			2														
	D			2														

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
British East Africa (see also table above):							
Kenya	C	171	107	97	87	73	50
Ecuador: Guayaquil	C	0	0				
	D	0	0				
Plague-infected rats		0	0				
Greece (see also table above)	C		1				2
Indo-China (see also table above)	C		11	1	2	4	
Madagascar (see also table above):							
Ambositra Province	C	1					
	D	1					
Antsirabe Province	C	19	3	24	11	21	
	D	19	3	21	11	21	
Miarinarivo Province	C	5	1	1	2	7	
	D	5	1	1	2	7	
Moramanga Province	C	1	3		27	18	
	D		3		27	17	
Madagascar (see also table above)—Con.							
Tananarive Province	C	15	16	28	39	79	
	D	11	16	28	38	79	
Senegal:							
Baol [1]	C	13	2	62	79	48	53
	D	11	2	48	20	23	35
Dakar [1]	C	72	53	140	108	3	
	D	42	117	122	90	8	
Louga [1]	C	74	60	138	75	61	37
	D	27	21	103	33	30	25
Thies [1]	C	21	52	54	34	12	24
	D	8	35	30	20	4	15
Tivaouane [1]	C	135	43	119	110	20	53
	D	69	28	70	54	14	31

SMALLPOX

Place		June 1–28, 1930	June 29–July 26, 1930	July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930 4	October, 1930 11	October, 1930 18	October, 1930 25	November, 1930 1	November, 1930 8	November, 1930 15	November, 1930 22	November, 1930 29	December, 1930 6	December, 1930 13
Algeria.																	
Algiers	C		1	3													
Constantine	C	1	1									1					
Arabia Aden	C		1														
Brazil Rio de Janeiro	C											2					
British East Africa (see also table below)																	
Tanganyika	C	1 610	168	242	522	27	43	4	21	3	1						
	D	301	42	37	60	1		1	4	1							
British South Africa Southern Rhodesia	C	79	31	1	1	14	39	96	2	2	54	1	38				
Canada.																	
Alberta	C		5	1	1		13	8	1					1			
British Columbia—Vancouver	C	2	6	6	2	1			1		3					1	
Manitoba	C	4			1												
Ontario	C	47	24	20	10	1		3	15		20	9		7	12	3	
Ottawa	C	15	13	7	5					14		9	14		8	1	1
Toronto	C	4	1		1										2	2	
Quebec	C	4	3	5										1			1
Montreal	C			7													
Saskatchewan	C	22	5	8	1		3				2			2		16	
China																	
Changking	C	1	P	P	P	P	P	P	P	P	P	P	P	P			
Foochow	C	P	P	P	P		P				P		P				
Hong Kong	C	4	2														
	D	3	1														
Manchuria—																	
Harbin	C	4	3	2													
Kwantung—Dairen	C	16	8											1		P	
	D	1															
Nanking	C	P	P	P	P	P	P	P	P	P	P	P					
Shanghai—																	
Foreigners only	C	5	4	3	18				1	1		1				3	
Including natives	D	3			2								1				
Swatow	D	4	1	4	2	1			3	1	1		1	1			
Tientsin	C					1											

[1] Reports incomplete

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Aug. 24-Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930 4	11	18	25	November, 1930 1	8	15	22	29	December, 1930 6	13
Chosen (see table below).																	
Colombia:																	
Barranquilla	C			2													
Buenaventura	C	6	10	2													
Cali	D						1		1								
Costa Rica: Port Limon	C	2															
Curacao (alastrim)	C	1	2	1													
Dutch East Indies:																	
Borneo	C	12	2														
	D	1															
Java—																	
Batavia and West Java	C	13	8	12	11	10	2	1	1	2	13	11					
	D	3	5	5	4	1	1	1	1	2	1	1					
East Java and Madura	C		1														
Sanggi Islands	C		11	36	14					29							
	D		3	2	3					3							
Egypt: Port Said	C		3														
France (see table below).																	
Great Britain																	
England and Wales	C	926	529	344	341	82	74	44	125	86	87	92	107	116	160	95	
Ashton under Lyne	C	7	8														
Bradford	C		1				1	1	1	1	1						
Cardiff	C		2							1							
Leeds	C		1							1			2				
London	C	498	250	178	164	30	34	23	33	29	32	41	47	52	67	27	
London and Great Towns	C	753	408	285	268	55	56	32	80	52	58	68	82	88	136	74	
	D							1			1						
Stoke-on-Trent	C	32	9	2	2			1			1						
Scotland	C	4	1		5												
	D		1														
Honduras: Naco	C				5												
India	C	12,962	7,630	4,877	3,171	611	528	567									
	D	3,531	2,348	1,246	680	202	122	113									

[illegible]	C	[illegible]	[illegible]	12	6			1								1	
	D	79	33	10	5											1	
Calcutta	C	131	73	25	14	3	4	3	2	2	4	3		3	5	6	
	D	146	56	21	9	3	4	3	1	2	2	3		3	2	4	
Cochin	C	16	6	14	3			8	4	3	5	10	7	4	5	6	
	D	4			1			1		1			2	2		2	
Karachi	C	7	1	4	4									2			
	D	3		3	2										1		
Madras	C	35	49	38	34	4	4	8	3	2	1	2	4	3	5	6	
	D	10	12	11	6	1	2	3	2			2				2	
Moulmein	C	21	18	2	1												
	D	7	1	1	1												
Negapatam	C	2	4	4	9	4	2	5	3	2	2	2	3	3		1	
Rangoon	C	9		3					2			1			1		
	D	2										1					
Tuticorin	C	1							1								
Vizagapatam	C	1						1									
India (French)																	
Chandernagor	C	19	4		3			3			3						
	D	3	3		2			1			1						
Karikal	C	11	2	9	5	1											
	D	8	2	9	2	1											
Pondicherry Province	C	23	26	22	35	11	10	6	11	2	2		7	7			
	D	23	25	22	33	11	8	6	11	2	2		7	7			
India (Portuguese)	C	28	1	9	4												
	D	10	1	2													
Indo-China (see also table below):																	
Pnompenh	C		1					2							1		
	D	1	1	1											1		
Saigon and Cholon	C	1		1	1						2			2	1		
	D			3	1						2			1			
Iraq:																	
Baghdad	C	1	3	1	1		2										
	D		1	1													
Mossoul Liwa	C	4	67			63		4	2			6		7	9		
	D	1	20			27								1	1		
Ivory Coast (see table below).																	
Mexico (see also table below)																	
Jalisco (State) Guadalajara	D	15	4	1			2		1	1		1	1	1		2	
Juarez	C	6		2													
	D	1		1		1				1							
Mexico City and surrounding territory	C	77	37	10	12	1	3	5	4	1	3	3	2	1	2		
	D	17	8	6	5			1	2	1		1					
Progreso	D	1															
Vera Cruz	C										1						
Morocco (see table below).																	
Nigeria: Lagos	C	1															
Poland	C	2								2	3			1	2		
Portugal																	
Lisbon	C	10	13	50	27	4	5		7	12			8	11		15	
Oporto	C			1													
Siam	C		6				1										
	D		3														

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		June 1–28, 1930	June 29–July 26, 1930	July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Week ended— Sept 27, 1930	October, 1930				November, 1930					December, 1930	
							4	11	18	25	1	8	15	22	29	6	31
Somaliland, British: Boales	C						1					1				1	
	D						1										
Spain	C	12	5	2	5					14	5	11	21	23	21		
Straits Settlements	C	9	11	8	6	1	1	1	2	3	3	4		3	9		
	D	2	3	3	1			1			1	1		1	2		
Sudan (Anglo-Egyptian)	C	67	12	42	128	25	1	56		3			2		3		47
	D	3	1	3	52	2		5					1				5
Sudan (French) (see table below).																	
Switzerland. Berne Canton	C		1	2		1											
Syria (see table below).																	
Tunisia: Tunis	C	2	1			2											
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C		P		P			P	P	P	P	P	P				
Orange Free State	C		P	P							1	1	P				
Transvaal	C			P	P	P		P	P	P	P	P	P				
Upper Volta	C	13															
On vessel: S. S. Manoa, from Honolulu to San Francisco	C		1														

Place		May, 1930	June, 1930	July, 1930	August, 1930			September, 1930			October, 1930			November, 1930	
					1–10	11–20	21–31	1–10	11–20	21–30	1–10	11–20	21–31	1–10	11–20
Indo-China (see also table above)	C	305	213	238	59	34		54	52	86	32	62	164		86
Ivory Coast	C												4		2
Sudan (French)	C	274	76	34			39		P			17			
	D	32	18				3					2			
Syria: Beirut	C	7	7	2	1										

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
British East Africa (see also table above):							
Kenya	C	171	142	186		424	
Uganda	C	78					
	D	69					
Chosen	C	107		3	2		
	D	35					
Seishin	C	2	1	2			
	D	1					

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
France	C	51		1			
Mexico Durango (see also table above)	D	4	3	3	3	2	
Morocco	C	18	5	3	8	1	4
Turkey	C	16					

TYPHUS FEVER

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug 23, 1930	Aug 24-Sept 20, 1930	Week ended— Sept 27, 1930	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20
Algeria																		
Algiers	C	3	6	2	3							1			2			
Constantine Department	C	12	2	3			2			1					1			
Oran	C	4	3	1	1			1	2						3			
Bulgaria	C	16	10	1	4	2		1	3			1	2	1				
	D	1	1															
China																		
Manchuria—Harbin (see also table below)	C	8	2	2	2				1									
Shanghai	C			1														
Chosen (see table below)																		
Czechoslovakia (see table below)																		
Egypt																		
Alexandria	C	1	1	1	3	1							2		1			
Beheira Province	C	45	15		1													1
	D	4	2															1
Cairo	C			7	2												1	
Port Said	C			4	1		1			1	1							
Great Britain. Scotland—Dunfermline	C		1															

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug 23, 1930	Aug. 24-Sept 20, 1930	Week ended— Sept 27, 1930	October, 1930 4	11	18	25	November, 1930 1	8	15	22	29	December, 1930 6	13	20
Greece (see table below).																		
Ireland:																		
Irish Free State—																		
Galway County—Oughterard	C		2															
Leitrim County—Mohill	C	9	1															
Mayo County—																		
Ballina	C	1	1															
Castlebar	C			1														
Westport	C		2	1														
Roscommon County—																		
Roscommon	C		1															
Strokestown	C		1															
Wicklow County—Shillelagh	C	4	2															
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico:																		
Durango	D				1	1		1										
Mexico City, including municipalities in Federal District	C	9	5	9	7			3	5	1	1	5	4	1	1			
	D	1		2	2			2		1		3		2	3			
Morocco	C	15	11	8	2					1		1	1					
	D								1									
Palestine	C	2	6	3	3		1	1	1			2	1	1	6			1
Poland	C	117	36	34	23	3	6	6	7	7	8	15	7	12		21		
	D	11	4	3	1	1			1					1		3		
Portugal: Oporto	C			1			1		1		2	1	1	2	2	2		
Rumania	C	53	28	9	4	3	4	1	6	4	13	10	14	19				
	D	5	8	2								1	1	1				
Spain	C	3	3		1			1	1			4						
	D		1		1			1	1									
Tunisia	C	18	24	10	6	1	1	1	9					5		23		

Turkey (see table below)																		
Union of South Africa																		
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P						
Municipality of East London	C		1		2			1										
Natal	C	P	1	P	P		P	P	2	P	P							
Orange Free State	C	P	P	P	P													
Transvaal	C		P	P	P	P	P	P	P	P	P	P	P					
Yugoslavia (see table below).																		

Place		June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930
China: Harbin (see also table above)	C		14	5		3	
Chosen: Seoul	C	2	3	2	1		
Czechoslovakia	C	1		1			16
Greece: Athens	C	3	6	6	4	4	4
Latvia	C	3	3	1	2		
Lithuania	C	16	18	7	24	1	5
	D			1	2		1
Turkey	C	2	7	2			1
Yugoslavia	C	6					
	D						

YELLOW FEVER

	Cases
Brazil	
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold Coast	
July 10, 1930	1
Albosso, Aug. 4, 1930 (death)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

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UNITED STATES TREASURY DEPARTMENT

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JANUARY 16 - - - 1931

SPECIAL ARTICLES

Summary of Current Prevalence of Communicable Diseases

Age Incidence of Communicable Diseases in a Rural Population

Relation of Plankton to Natural Purification of Streams

UNITED STATES
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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 46 JANUARY 16, 1931 NO. 3

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES [1]

November 30–December 27, 1930

The prevalence of certain important communicable diseases, as indicated by weekly telegraphic reports from State health departments to the Public Health Service, is summarized below. The underlying statistical data are published weekly in the Public Health Reports under the section entitled "Prevalence of Disease."

Poliomyelitis.—The poliomyelitis incidence has shown another decline, this time about 60 per cent from the incidence of the preceding period. In a group of 43 States, 294 cases were reported, as compared with 725 during the preceding period.

Part of this decline, though not all, represents a normal seasonal drop. The current incidence is about 3.3 times the incidence for the corresponding period of last year, whereas, during the preceding period the ratio to last year was slightly above 4. In other words, the picture suggests a moderate decline in epidemic tendency in this relative sense as well as in an absolute sense.

Judged by these ratios to last year's experience, the epidemic tendency seems to be declining in all regions except some portions of the South and East.

Meningococcus meningitis.—During the current 4-week period, 363 cases of meningococcus meningitis were reported, representing about 54 per cent of the incidence for the corresponding period of last year. During the preceding period of this year 319 cases were reported, i. e., about 72 per cent of the cases for the corresponding period of last year. In other words, the situation continues to improve in relation to last year.

Smallpox.—During the current period 1,966 cases of smallpox were reported, as compared with 3,897 during the same period last year, when there had been a pronounced rise. The current incidence is not far from the average of the years preceding 1929.

Influenza.—The incidence continues to be the lowest of recent years for the season involved. Reported cases numbered 2,361, as

[1] From the Office of Statistical Investigations, U. S. Public Health Service. The numbers of States included for various diseases are as follows: Typhoid fever, 41; poliomyelitis, 43; meningococcus meningitis, 42; smallpox, 42; measles, 38; diphtheria, 42; scarlet fever, 41; influenza, 31

compared with 3,307 during the same period of last year, i. e., a decline of about 30 per cent. This favorable situation applies to all regions except the Great Lakes section, where a slight excess was reported over last year's incidence.

Typhoid fever.—The reported incidence of typhoid fever (1,070 cases) for the current period represents a drop of about 44 per cent in four weeks. This decline represented largely the normal seasonal influence. In relation to the experience of the preceding two years, the current incidence is still about 50 per cent in excess. It is high in all regions except the Great Lakes and the far West.

Scarlet fever.—For the country as a whole, the incidence of scarlet fever is not far from the seasonal average of recent years, 13,470 cases having been reported, against 15,203 last year, for this period.

Diphtheria.—Once again there is a record low prevalence of diphtheria, taking due account of season; reported cases numbered 5,529, as compared with 7,592 for the same period last year—a decline of about 25 per cent. Three years ago, during the corresponding 4-week period, 9,097 cases were reported.

All regions share in this gratifying situation, though in different degrees.

Measles.—The reported incidence of measles, 11,529 cases, is low in relation to recent years. Since 1926, when 21,371 cases were reported during these four weeks, there has been a decline each year. During the four years the decline has been almost 50 per cent. There are reasons for suspecting, however, that part of the decline may be due to less complete reporting during recent years.

Mortality, all causes.—During the current period, the mortality from all causes as reported by the Census Bureau averaged 11.9 per thousand population, annual basis, compared with 13.3 during this period last year.

AGE INCIDENCE OF COMMUNICABLE DISEASES IN A RURAL POPULATION[1]

By Edgar Sydenstricker, *Statistician, United States Public Health Service,* and *Director, Division of Research, Milbank Memorial Fund,* and Selwyn D. Collins, *Associate Statistician, United States Public Health Service*

The importance of data relating to the incidence of the acute infectious diseases among persons of different ages in populations living in various environments does not need lengthy explanation; it is fully realized because of the aid which information of this kind can give to epidemiology, to sound administrative practice, and to

[1] From the Office of Statistical Investigations, United States Public Health Service, and the Division of Research, Milbank Memorial Fund.

some degree to immunology. The valuable records collected in Providence over a long period of years by Chapin (*1*) constituted the earliest as well as one of the most useful contributions to a mass of data that slowly have been growing since. Among other contributions may be mentioned the studies of Butler (*2*), Corney (*3*), Collins (*4*), Henderson (*5*), Halliday (*6*), Doull (*7*), Frost (*8*), Fales (*9*), Godfrey (*10*), Lombard and Scamman (*11*), Sydenstricker (*12*), and Wilson (*13*), which have recently been summarized by one of us (S. D. C.) (*4*). Practically all of these studies, with the exception of those by Fales and by Lombard and Scamman relate, however, to urban populations.

The present communication, while including a comparatively small number of persons, may be of interest because it deals with a rural population in Cattaraugus County, N. Y., where the Milbank Memorial Fund has been assisting the development of public health activities and where the United States Public Health Service, with the cooperation of the fund and the county health department, began a morbidity study and a series of epidemiological studies in 1929. The data presented here are of two kinds: (1) The reports of certain communicable diseases made to the county health department during the period 1925–1929, classified according to age of the person attacked and residence, the latter being with respect to the degree of rurality of the population; (2) histories of prior attacks of certain communicable diseases among persons of different ages which were obtained by field assistants of the United States Public Health Service in the course of house-to-house visits in a population of approximately 5,000 in one area of this county. The first set of records enables comparisons to be made similar to those published by Fales for broad urban and rural groups, but with finer distinction as to the rural character of a population which he classified as rural. The second set of data are similar to those obtained by Frost in Baltimore, Lombard and Scamman in Massachusetts, and by Sydenstricker and Collins in Hagerstown, and are comparable, in a lesser degree, to the results of studies made by some others to whom reference will be made later.

The reports made to the county health department during the period 1925–1929 included 3,156 cases of measles, 563 cases of scarlet fever, 495 cases of German measles, 1,456 cases of whooping cough, the other diseases being too few in number to yield significant results. These have been subdivided according to age and according to type of locality, as follows: (*a*) Cases occurring in Olean, a city of about 23,000; (*b*) in villages of not over a few hundred population; (*c*) among persons living on farms, designated as "rural." The distri-

butions according to age groups for these four diseases are given in Table I.[2]

TABLE I.—*Comparison of distributions according to age of reported cases of measles, scarlet fever, and whooping cough in Olean, villages, and rural part of Cattaraugus County, 1925–1929*

Age	Per cent			Number		
	Olean	Villages	Rural	Olean	Villages	Rural
MEASLES						
0 to 4	33.29	20.40	16.84	472	134	182
5 to 9	54.80	44.44	31.54	777	292	341
10 to 14	7.62	20.55	24.14	108	135	261
15 to 19	1.90	7.31	13.78	27	48	149
20+	2.40	7.31	13.69	34	48	148
Total	100.00	100.00	100.00	1,418	657	1,081
SCARLET FEVER						
0 to 4	23.19	20.00	14.56	48	19	38
5 to 9	37.68	37.90	31.03	78	36	81
10 to 14	18.36	20.00	28.74	38	19	75
15 to 19	7.25	11.58	9.58	15	11	25
20+	13.53	10.53	16.09	28	10	42
Total	100.00	100.00	100.00	207	95	261
WHOOPING COUGH						
0 to 4	49.76	52.36	37.39	312	133	215
5 to 9	45.29	43.31	41.39	284	110	238
10 to 14	3.19	3.15	16.35	20	8	94
15 to 19	1.12	.39	2.78	7	1	16
20+	.64	.79	2.09	4	2	12
Total	100.00	100.00	100.00	627	254	575

The differences in the age distributions can be shown in more detail for measles because of the larger number reported. The distributions are given by single years up to 15 years of age in Table II and plotted in Figure 1. The concentration of cases at the ages when children enter school is marked and may be due in part to more complete reporting at those ages, but the contrast in the distributions is quite striking, particularly between the town of Olean and the rural part of the county.

[2] Sufficiently detailed information on the age distribution of the population covered are not available for making adjustments of the percentages to a single age distribution. This refinement, however, does not seem necessary as the following distributions show:

Age distributions of population under 20 years in Olean and rural part of Cattaraugus County (State census, 1925)

Age group	Per cent (all ages=100 per cent)	
	Olean	Rural part[a]
0 to 4	9.53	9.13
5 to 9	9.91	9.68
10 to 14	9.25	9.41
15 to 19	9.13	8.70

[a] Exclusive of Salamanca (10,000 population) and Gowanda, but including villages.

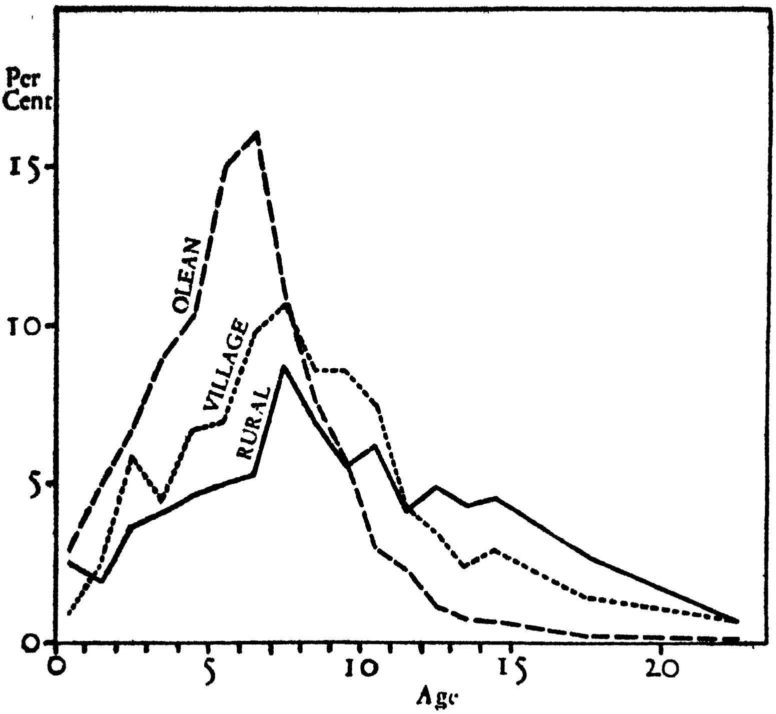


FIGURE 1.—Distribution according to single years of age, up to 15 years, of measles cases reported to the county health department for Olean, villages, and rural part of Cattaraugus County, N. Y., 1925–1929

TABLE II.—*Comparison of distribution according to age of reported cases of measles in Olean, villages, and rural part of Cattaraugus County, 1925–1929*

Age	Per cent			Number		
	Olean	Villages	Rural	Olean	Villages	Rural
−1	2.89	0.91	2.50	41	6	27
1	4.58	2.44	1.94	65	16	21
2	6.63	5.78	3.70	94	38	40
3	8.96	4.57	4.07	127	30	44
4	10.23	6.70	4.63	145	44	50
5	14.88	6.85	5.00	211	45	54
6	16.01	9.74	5.27	227	64	57
7	10.72	10.65	8.79	152	70	95
8	7.55	8.68	6.94	107	57	75
9	5.64	8.52	5.55	80	56	60
10	2.89	7.46	6.20	41	49	67
11	2.26	4.26	4.16	32	28	45
12	1.13	3.50	4.90	16	23	53
13	.71	2.44	4.35	10	16	47
14	.63	2.89	4.53	9	19	49
15–19	1.90	7.31	13.78	27	48	149
20+	2.40	7.31	13.69	34	48	148
Total	100.00	100.00	100.00	1,418	657	1,081

The indications are summarized in the following table (Table III) where a comparison is presented of the first quartile, median, and last percentile of the age distributions for each disease in the areas named.

TABLE III.—*Comparison of first quartiles, medians, and last percentiles of the age distributions of the reported cases of certain diseases in specified sections of Cattaraugus County, 1925–1929*

Disease	Age in years		
	Olean	Villages	Rural
Measles:			
First quartile	4.2	5.7	6.6
Median	6.1	8.3	10.3
Last percentile	10.7	17.6	24.7
Scarlet fever			
First quartile	5.2	5.8	6.6
Median	7.9	8.7	11.0
Last percentile	26.0	23.0	28.0
Whooping cough			
First quartile	2.9	2.7	3.5
Median	5.0	4.8	6.5
Last percentile	8.5	9.0	12.7
German measles:			
First quartile	[1] 7.2	7.4	
Median	[1] 9.7	12.1	
Last percentile	[1] 15.7	21.0	

[1] Including Salamanca, a town of 10,000 population.

It will be noted that, with hardly an exception, the more rural the population—even within an area ordinarily classified as "rural"—the higher are the ages at which each of these diseases occur. This finding is not only in accord with the statistical results of Fales's (*9*) comparisons of "urban" and "rural" data but adds weight to his general conclusion that for any one of the diseases under consideration "the difference in risk (of attack) between younger and older children tends to become less pronounced as one proceeds to the small cities, villages, and open country" (p. 780).

Reports of cases of most diseases notifiable under law are notoriously incomplete, especially the less fatal diseases over which no really effective control has been devised. In general, this has been true of Cattaraugus County.[3] Moreover, there is evidence to sup-

[3] At this writing sufficient records are not yet available from the morbidity study now under way to warrant any conclusions as to the completeness of reporting in rural parts of the county. In Olean, however, the cases appearing on the sickness records of about 540 children in one of the graded schools for 2 years were checked against the reports made to the health department with the following result:

Completeness of reporting of certain diseases among 540 school children in Olean, N. Y., 1926–1927 and 1927–1928

Disease	Cases recorded on school sickness report	Cases reported to health department	Completeness of reporting
			Per cent
Diphtheria	0	0	
Scarlet fever	4	4	100
Measles	55	34	62
Whooping cough	21	10	48
German measles	95	22	23
Chicken pox	13	0	0

These percentages are in general agreement with those found by Sydenstricker (*14*) for Hagerstown, Md. They indicate somewhat more complete reporting of measles and whooping cough and less complete reporting of chicken pox in Olean than in Hagerstown.

port the natural suspicion that the completeness of reporting of at least some of these diseases varies with age,[4] and any comparison of the age distributions for different areas must be made upon the assumption that these variations are similar. Obviously, therefore, any data that yield reasonably accurate information on the true incidence of these diseases are of value, particularly for rural areas.

In the initial canvass of approximately 5,000 persons in a rural part of Cattaraugus County, who form the population group for epidemiological observation by the United States Public Health Service, questions as to the past occurrence of certain communicable diseases were asked for all individuals under 30 years of age in the households visited. The informants in most instances were the housewives and the answers are believed to be as accurate as they could give them. Obviously, cases that did not manifest definite clinical characteristics were not recognized and therefore were not known, and probably some cases were forgotten, especially for older persons. The data thus must be regarded as understatements to a certain degree. They are summarized in Table IV.

TABLE IV.—*History of communicable disease among persons of different ages in a rural area of Cattaraugus County, N. Y.*

Disease	Per cent of persons observed who at some time in their lives had suffered attacks, classified by age at date of inquiry						
	Total under 30	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29
Measles	62.3	17 6	46 0	67 6	78.8	83.7	88.6
German measles	26.5	6.3	13.3	25.8	85.8	43.0	40 5
Whooping cough	60.4	19.2	46 7	71.0	77.1	78.0	77.6
Chicken pox	51.6	12.9	43 6	63 5	66 4	66.0	62.6
Mumps	36.4	11.5	26 8	40.2	45.1	49.8	50.1
Scarlet fever	9.5	.9	6.0	11.5	14.2	13.0	12.8
Diphtheria	1.7	0	.8	1.0	2 4	2.9	3.7
Typhoid fever	1.4	0	.4	.5	2.2	2 2	3.7
Smallpox	.4	0	0	.7	0	.7	1.1
Meningitis	.1	0	.2	0	0	.2	.3
Poliomyelitis	.4	0	.4	1.0	0	.2	0
Number of persons observed	2,491	426	483	414	410	406	352

[4] Sydenstricker and Hedrich (*15*) using the data obtained by house-to-house canvasses and the reports to the health department in Hagerstown, Md., made the following estimates for measles, whooping cough, and chicken pox:

Estimated completeness of reporting to the health department of certain communicable diseases at specific ages, Hagerstown, Md., 1922 and 1923 •

Age	Estimated per cent of cases that were reported		
	Measles	Whooping cough	Chicken pox
0 to 4	21.4	17 0	12.2
5 to 9	41.6	18 4	24.3
10 to 14	34.4	40.6	42.9
15+	50.0	10.0	50.0

The Cattaraugus results in general approximate the findings of Lombard and Scamman (*11*) for Shelburne and Buckland Townships in Massachusetts, which were largely rural; for some diseases (chicken pox, measles, and whooping cough) the percentages having histories of past attacks are strikingly similar, although the number of persons observed in the Massachusetts area is quite small.[5]

The particular point of interest afforded by the foregoing data lies in a comparison with similar data for urban areas. In Table V, therefore, such a comparison of the Cattaraugus County results is made with the results of a similar study in Hagerstown, Md., a city of some 30,000 inhabitants, where the same method (*16*) of obtaining information and, to some extent, the same field personnel were employed.

TABLE V.—*Comparison of communicable disease history among persons of different ages in an urban area (Hagerstown, Md.) with that in a rural area (in Cattaraugus County, N. Y.)*

Disease and area	Per cent of persons observed who at some time in their lives had suffered attacks, classified by age at date of inquiry					
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29
Measles:						
Cattaraugus	17.6	46.0	67.6	78.8	83.7	88.6
Hagerstown	22.3	75.8	92.8	93.0	93.8	91.1
Whooping cough:						
Cattaraugus	19.2	46.7	71.0	77.1	78.0	77.6
Hagerstown	17.6	56.9	76.3	78.3	79.4	78.2
Scarlet fever:						
Cattaraugus	.0	6.0	11.5	14.2	13.0	12.8
Hagerstown	1.7	4.6	7.7	10.8	9.4	10.5
Diphtheria:						
Cattaraugus	0	.8	1.0	2.4	2.9	8.7
Hagerstown	1.8	5.6	8.3	8.6	12.2	11.8
Typhoid fever:						
Cattaraugus	0	.4	.5	2.2	2.2	3.7
Hagerstown	.1	1.3	3.2	5.5	9.2	12.8
Smallpox:						
Cattaraugus	0	0	.7	0	.7	1.1
Hagerstown	.5	1.9	2.3	1.6	1.1	2.2
Number of persons observed:						
Cattaraugus	426	483	414	410	406	352
Hagerstown	840	915	760	610	485	528

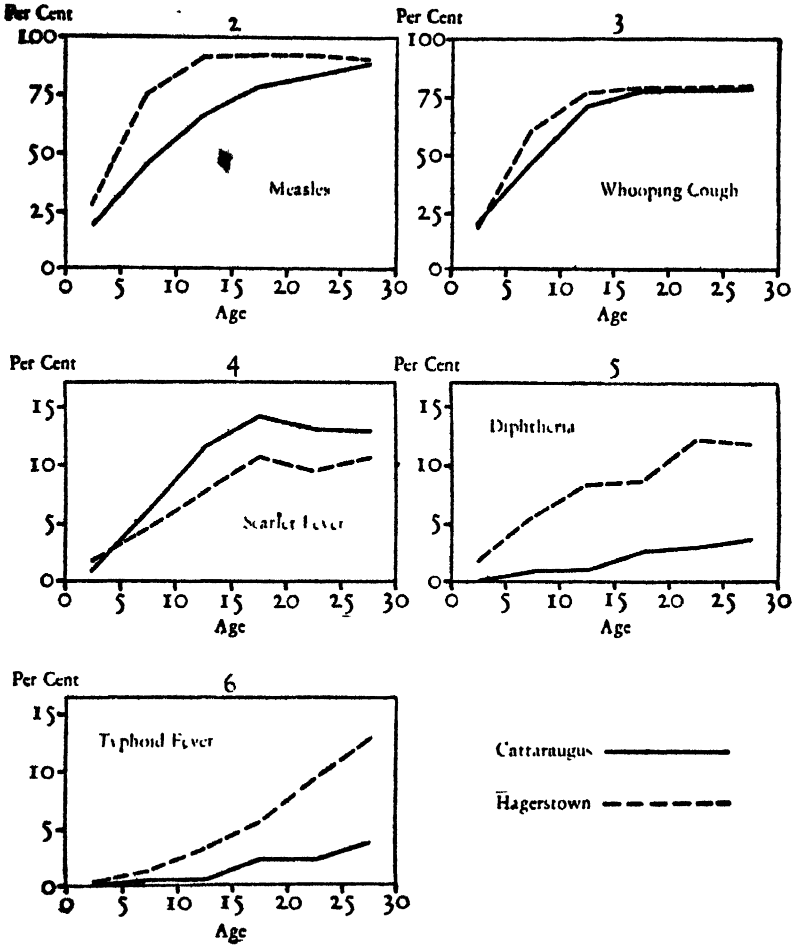
[5] The results of the Shelburne-Buckland survey are summarized in the following table from Lombard and Scamman's paper (*11*, p. 628):

Contagious diseases in Shelburne-Buckland

Disease	Per cent who had the disease prior to the survey, by age groups			
	0 to 4	5 to 9	10 to 14	15 to 19
Chicken pox	15.6	41.8	61.1	60.7
Diphtheria	0	2.0	4.4	8.3
German measles	4.1	23.5	33.3	22.6
Measles	9.0	29.6	63.4	69.1
Mumps	1.6	10.2	18.9	35.7
Scarlet fever	0.8	10.2	14.4	35.7
Whooping cough	24.6	55.0	74.5	71.4
Number of persons	122	98	90	84

It will be noted that the percentages are essentially cumulative and are comparable.

The *lower* percentages for Cattaraugus and the lag in the curves, as plotted in Figures 2 to 6, for all of the diseases except scarlet fever, are of particular interest.



FIGURES 2–6.—Percentages of a rural population (in Cattaraugus County, N. Y.) and of an urban population (in Hagerstown, Md.), of different ages, who had previously suffered an attack of measles, whooping cough, scarlet fever, diphtheria, or typhoid fever, as ascertained by canvasses of households

As regards scarlet fever, a reasonable explanation of the apparent exception may be suggested by the occurrence of epidemics of unusual magnitude in the Cattaraugus area during 1920–1923 and 1926–27,[6] whereas no epidemic of similar magnitude had occurred in Hagerstown in a period comparable chronologically.

[6] The reported incidence of scarlet fever in these years was about ten times the incidence usually reported.

As regards diphtheria, the curves for the two areas are far apart at every age period, the Cattaraugus percentages suggesting a definite "lag",[7] and the proportion of adult persons aged 25 to 29 years with a history of a previous attack in Hagerstown being over three times as high as that in the rural area. This lower prevalence of diphtheria in a rural area properly can be interpreted, in the light of the newer knowledge of the epidemiology of diphtheria, as indicating a lower immunity to the disease particularly among children under 15 years of age. The importance of this from the administrative point of view has been well recognized by Dr. R. M. Atwater, the commissioner of health for Cattaraugus County, in extending the age for immunization with toxin-antitoxin up to 15 years (*17*) (*18*) instead of up to 10 years, as is the usual practice in cities. The protection thus afforded has had some effect upon the diphtheria case rate during the past five years[8] (the immunization having been begun in 1925), particularly among younger persons, and may have accentuated slightly the lag in Figure 5. But obviously the contrast with the Hagerstown situation is not greatly affected, especially in a period of low diphtheria incidence, such as has been general in New York. Practically no diphtheria immunization in Hagerstown had been done before the study was made.

With respect to typhoid and smallpox, the interpretations of the data obviously are somewhat different. Hagerstown had an annual typhoid rate (in the population group observed for over two years) of 1.2 per 1,000 (*16*) which was probably typical of the section in 1922–23, and its water supply and excreta-disposal systems were by no means modern (*19*). The typhoid rate in Cattaraugus had not been unusual, except for the marked outbreak in 1928 in Olean, which is 30 miles away from the morbidity observation area. There seems to be no good reason why the much higher typhoid percentages in Hagerstown should not be regarded as an illustration of the relative freedom of a rural population from the disease when compared with an urban population living under insanitary conditions.[9] The

[7] The ratio of the Cattaraugus percentages to those of Hagerstown for successive age periods beginning with 5 to 9 years are 7.0, 8.3, 4.3, 4.2, and 3.2 to 1.

[8] The low immunity in Cattaraugus has been corrected to a considerable extent by the administration of toxin-antitoxin, as the following histories of immunization against diphtheria for the population under study show:

Age	Per cent immunized	Age	Per cent immunized
0 to 4	31.5	15 to 19	29.7
5 to 9	65.6	20 to 24	7.3
10 to 14	64.6	25 to 29	3.1

[9] It is planned to make a comparison later with an urban area having more modern water supply and excreta disposal facilities.

relatively small opportunity for contact in a rural area is an even greater factor in the wide difference in smallpox incidence, and this in spite of the fact that a much larger proportion of persons had been vaccinated in Hagerstown than in Cattaraugus County in all of the age periods considered save "under 5" as the following table shows:

TABLE VI.—*Comparison of the history of vaccination against smallpox among persons of different ages in an urban area (Hagerstown, Md.) with that in a rural area (in Cattaraugus County, N. Y.)* [1]

Area	Per cent of persons observed who had been vaccinated against smallpox, classified by age at date of inquiry						
	Total under 30	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29
Cattaraugus	24.8	3.0	11.8	18.2	21.6	42.4	60.2
Hagerstown	69.8	1.5	65.1	93.7	97.8	94.3	91.8

[1] See Table V for the number of persons observed. The percentages are for persons, not frequencies of vaccination, but they indicate roughly the extent to which vaccination was done in the two areas at different ages.

By no stretch of the imagination, of course, can this observation as to smallpox incidence be regarded as suggesting the inefficacy of vaccination; rather, it points the more definitely to the importance of differences in the opportunity for infection in urban and rural areas.

The "lag" in the curves shown in Figures 2, 3, and 5 for measles, whooping cough, and diphtheria in Cattaraugus may be expected upon the hypothesis of a slower rate of immunization in a more sparsely settled area. But in the instances of measles and whooping cough, the rather interesting indication is given that in both a rural and an urban area the percentages of persons in the age period 25 to 29 who had been attacked are about the same.[10]

A further comparison of the Cattaraugus County data, scanty as they are, with the curves which Collins (*4*), derived from a study of the records of a number of localities, nearly all of which were urban, is not without interest. For measles (fig. 7) and whooping cough (fig. 8) it is again indicated that in both a rural area and in these larger urban areas the percentages of total population observed which had positive histories were approximately the same when about 30 years of age was reached, but the Cattaraugus experience manifested a very definite lag.

[10] This indication may seem somewhat surprising in view of the Army experience during the World War. It will be recalled that the incidence of measles among recruits from rural areas was higher than that among recruits from urban areas. (See Siler, J. F., Communicable and Other Diseases, Vol. IX, in the Medical Department of the U. S. Army in the World War, pp. 416-417, and Long, A. C., and Davenport, C. B.: The Immunity of City Bred Recruits, Archives of Internal Medicine, 24 129.) It may be suggested, however, that the great majority of recruits were under 25 years of age. Furthermore, the smallness of our urban and rural samples should be kept in mind; further data are necessary for dependable generalizations.

In the Cattaraugus survey an inquiry was also made as to deaths among children of each family and information was obtained as to age, date, and cause of death. This made possible a tabulation of persons having had attacks of certain communicable diseases among

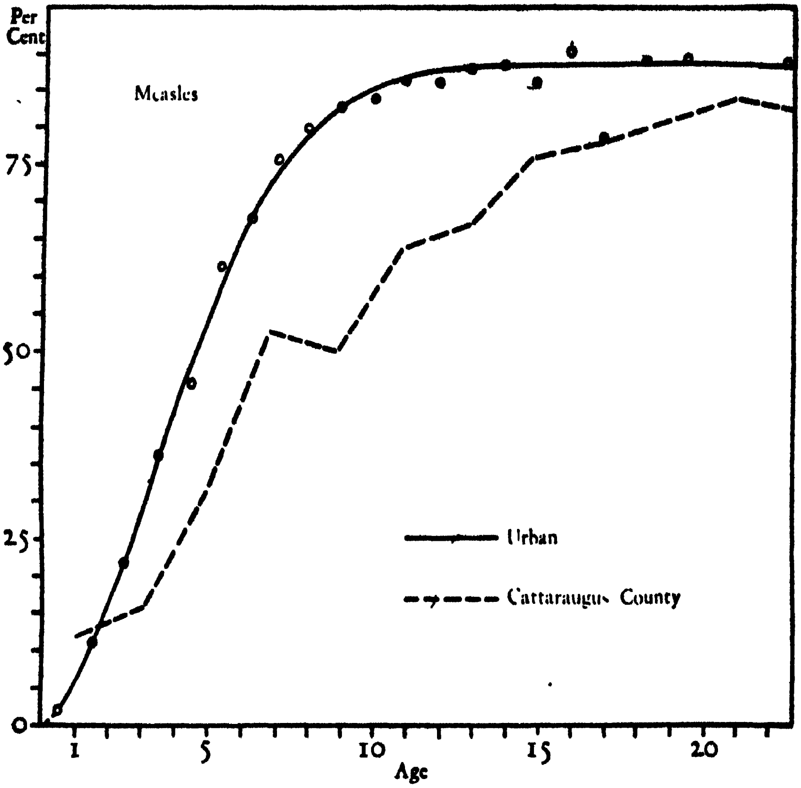


FIGURE 7.—Percentages of the population of different ages who had previously suffered an attack of measles, compared for a rural area in Cattaraugus County, N. Y., and for various localities, principally urban. The smoothed graph for "urban" is of the catalytic type of the logistic curve, the equation being $y=89\ (1-e^{+.00586-.04869x-.02899x^2})$ where y=percentage of persons who have had an attack and x=age in years

persons under 30 years of age and of the deaths occurring among such persons due to the specified diseases. Fatality rates were then computed that probably are much more accurate than those based upon reported cases in rural areas, as follows:

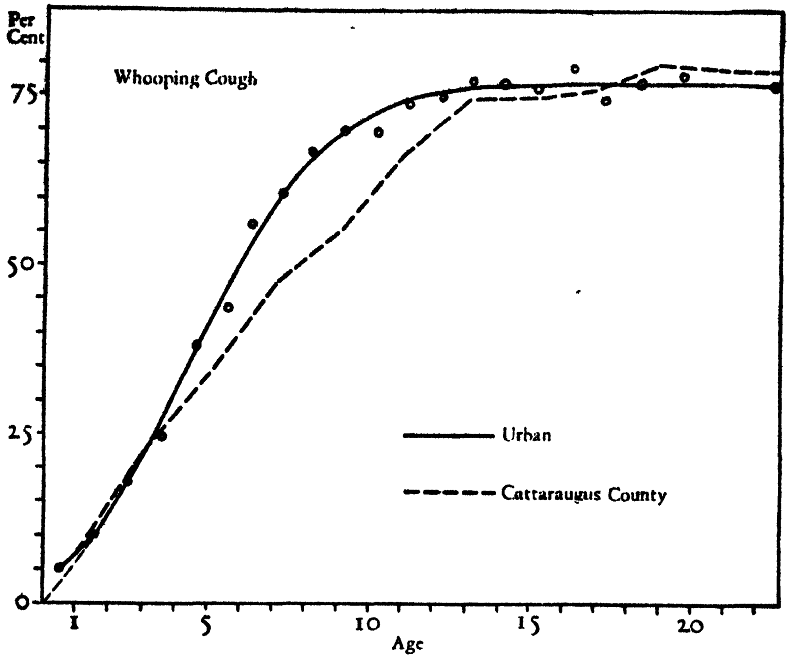


FIGURE 8.—Percentages of the population of different ages who had previously suffered an attack of whooping cough, compared for a rural area in Cattaraugus County, N. Y., and for various localities, principally urban. The smoothed graph for "urban" is of the catalytic type of the logistic curve, the equation being $y=77\,(1-e^{-.05385-.01334x-.02703x^2})$ where y=percentage of persons who have had an attack and x=age in years

TABLE VII.—*Case fatality of the common communicable diseases in a rural population in Cattaraugus County, N. Y., based on cases and deaths occurring at any time since birth among persons under 30 years of age*

Disease	Total number of cases (including deaths)	Number of deaths	Per cent of cases that were fatal
Measles	1,561	9	0.58
German measles	654	0	----------
Whooping cough	1,502	5	.33
Chicken pox	1,270	0	----------
Mumps	901	1	.11
Scarlet fever	243	4	1.65
Diphtheria	47	4	8.51
Typhoid	35	0	----------
Smallpox	11	1	9.09
Meningitis	8	5	62.50
Poliomyelitis	14	3	21.43

Similar information was not obtained in the Hagerstown survey, but a comparison with fatality rates in another urban area will be made later.

ACKNOWLEDGMENTS

Acknowledgments are made to Dr. R. M. Atwater, commissioner of health, Cattaraugus County, for the use of communicable-disease records in the county health department. The histories of communicable diseases in a rural population were obtained from residents in the Ellicottville area of Cattaraugus County, to whom grateful acknowledgment is made, under the supervision of Miss F. Ruth Phillips of the United States Public Health Service. We are also indebted to Dr. G. A. Baker for making the tabulation of reported cases in Cattaraugus County.

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PLANKTON IN RELATION TO THE NATURAL PURIFICATION OF POLLUTED STREAMS

Reedbirds and ducks so frequently seen in their natural feeding ground, such as a marsh, excite no comment, whereas a few buzzards circling low will attract attention at once, because of the very different food habits of the latter. We know that an animal carcass is in the marsh, and that the buzzards will speedily dispose of it. Reedbirds, ducks, and buzzards all react to the presence of food.

In somewhat similar fashion the microscopic animals in water are attracted by certain materials which serve as their food. Organic matter, such as sewage, provides food for certain kinds of organisms that are not present in unpolluted water. Finding these organisms, we know that the water is polluted, and that these particular organisms will disappear, like the buzzards, when and if their food supply is exhausted.

In order to learn more about the amount and kind of work done by these organisms in nature's purification of such a polluted stream, a study[1] was made of the much-discussed Illinois River, heavily polluted by the sewage and stockyards waste from the city of Chicago, and well suited to a study of this phase of microscopic life. Approximately 1,000 weekly samples, collected at every season, and including all sections of the river (which is nearly 300 miles long), were analyzed and studied. Particular information was sought relative to the abundance of such organisms as thrive in sewage-polluted water, and their gradual replacement downstream by organisms known to require water of a better grade. The gradual purification of the stream was thus expressed in terms of the prevalent kinds of microscopic organisms, both plants and animals, and collectively known as plankton.

[1] A study of the pollution and natural purification of the Illinois River. II. The plankton and related organisms. By W. C. Purdy. Public Health Bulletin No 198.

The relative abundance of microscopic green plants was a matter of interest, inasmuch as these plants help to purify the water by the oxygen they give off, similar to the action of the common "fish moss" in goldfish bowls.

Very briefly summarized, the results of this study indicate the following changes as the water progresses:

1. The swift upper portion of the river, heavily polluted but thoroughly mixed, is well seeded at the start with microscopic organisms from the tributary Des Plaines River and from Lake Michigan.

2. Gradually decreasing velocity distributes the suspended matter over a very large total area of bottom downstream, facilitating biological action.

3. The grayish water becomes clear, and loses its odor of sewage 70 or 80 miles downstream from the Chicago Drainage Canal outlet.

4. Correlated changes in the plankton content are: (*a*) decrease of pollutional organisms formerly predominant; (*b*) increase of organisms of the cleaner-water kinds, these becoming predominant, and maintaining this status thereafter; (*c*) increase in relative abundance of microscopic green plants.

5. In all sections of the river, and at all seasons, the microscopic green plants were decidedly more abundant, volume for volume, than were the microscopic animals.

6. Malodorous bottom sediments from the polluted upper Illinois contained very large numbers of "sludge worms," and no gill-bearing insect larvæ, whereas sediments from the lower portions of this stream were free of odor, contained very few worms, and showed a variety of gill-breathing insect larvæ.

A suitable background for the above study is furnished by 11 abstracts of similar studies made by various investigators on other streams and on the Illinois River. The large amount of data relative to the Illinois River is summarized in 54 tables and 18 graphs. There are also a number of photographs showing field conditions, and some photomicrographs of the more important plankton organisms.

COURT DECISION RELATING TO PUBLIC HEALTH

Conviction for exposing a person to venereal disease.—(Oklahoma Criminal Court of Appeals; Reynolds *v.* State, 292 P. 1046; decided Aug. 29, 1930.) Section 9008 of the Compiled Oklahoma Statutes, 1921, provided as follows:

> Any person who shall, after becoming an infected person and before being discharged and pronounced cured by a reputable physician in writing, marry any other person, or expose any other person by the act of copulation or sexual intercourse to such venereal disease or to liability to contract the same, shall be guilty

of a felony and upon conviction shall be punished by confinement in the penitentiary for not less than one year or not more than five years.

Under this statute the plaintiff in error, defendant in the trial court, was convicted of exposing a female to gonorrhea. This conviction, with the sentence modified because of certain circumstances, was affirmed by the criminal court of appeals.

DEATHS DURING WEEK ENDED DECEMBER 27, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended December 27, 1930, and corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)

	Week ended December 27, 1930	Corresponding week, 1929
Policies in force	74, 818, 700	75, 162, 784
Number of death claims	12, 146	12, 641
Death claims per 1,000 policies in force, annual rate	8. 5	8. 8

Deaths [1] from all causes in certain large cities of the United States during the week ended December 27, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Dec 27, 1930				Corresponding week 1929		Death rate [2] for the 52 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Total (78 cities)	7, 997	12 1	699	[4] 56	12. 8	756	11 9	12. 7
Akron	32	6. 6	4	37	9 5	7	7 8	9. 3
Albany [5]	46	18. 8	8	165	17. 3	1	14 8	16 4
Atlanta	86	16. 7	9	92	17 9	14	15. 6	16. 0
White	43		6	95		11		
Colored	43	([6])	3	86	([6])	3	([6])	([6])
Baltimore [5]	214	13. 9	22	77	13 5	18	14. 0	14 7
White	165		12	53		7		
Colored	49	([6])	10	160	([6])	11	([6])	([6])
Birmingham	70	14. 1	14	135	15. 1	7	13. 6	15. 8
White	37		10	158		2		
Colored	33	([6])	4	98	([6])	5	([6])	([6])
Boston	209	13 9	20	58	15. 1	24	14. 0	14. 9
Bridgeport	22	7. 8	1	17	9. 6	4	10 8	11 9
Buffalo	143	13 0	16	71	14. 1	13	12. 9	14. 0
Cambridge	31	14. 2	2	40	9. 7	3	11. 9	12. 4
Camden	19	8. 5	5	88	16. 5	2	13. 4	14. 5
Canton	16	7. 9	0	0	14. 5	3	9. 7	11. 1
Chicago [5]	656	10. 1	45	40	12. 2	76	10. 4	11. 3
Cincinnati	123	14. 2	7	41	14. 2	7	15. 6	17. 0
Cleveland	189	10. 9	14	42	11. 7	17	11. 0	12. 3
Columbus	87	15. 6	11	108	13. 5	2	15. 4	14. 8
Dallas	64	12. 7	9		14. 0	8	11. 5	11. 7
White	49		7			7		
Colored	15	([6])	2		([6])	1	([6])	([6])
Dayton	42	10. 9	3	45	11. 1	3	10. 8	11. 5
Denver	92	16. 6	7	76	16. 8	4	15. 0	14. 8
Des Moines	32	11. 7	5	92	10. 3	0	11. 6	11. 5
Detroit	298	9. 8	38	58	9. 6	34	9. 2	11. 0

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended December 27, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Dec. 27, 1930				Corresponding week 1929		Death rate for the 52 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1930	1929
Duluth	26	13.4	1	27	12.4	1	11.6	11.5
El Paso	38	19.3	4		21.8	3	17.1	19.3
Erie	23	10.3	2	44	15.0	4	11.0	12.0
Fall River [5, 7]	18	8.2	3	69	10.9	1	11.6	13.5
Flint	19	6.3	2	24	8.9	5	8.9	10.5
Fort Worth	36	11.6	7		13.8	5	11.2	12.2
White	33		6			3		
Colored	3	([6])	1		([6])	2	([6])	([6])
Grand Rapids	30	9.3	2	30	13.5	7	10.1	10.2
Houston	70	12.5	4		15.0	8	12.2	12.7
White	48		3			6		
Colored	22	([6])	1		([6])	2	([6])	([6])
Indianapolis	117	16.7	7	53	20.0	9	14.4	14.9
White	96		6	52		8		
Colored	21	([6])	1	58	([6])	1	([6])	([6])
Jersey City	79	13.0	12	104	11.8	5	11.4	12.4
Kansas City, Kans	28	11.9	1	23	21.0	8	11.8	12.8
White	23		1	28		4		
Colored	5	([6])	0	0	([6])	4	([6])	([6])
Kansas City, Mo	89	11.8	8	67	15.1	12	13.4	14.0
Knoxville	31	15.2	4	94	16.6	6	13.4	13.8
White	24		3	78		4		
Colored	7	([6])	1	243	([6])	2	([6])	([6])
Los Angeles	384	16.1	24	73	12.6	15	11.2	11.4
Louisville	85	14.4	12	103	11.7	4	13.5	15.2
White	65		10	98		3		
Colored	20	([6])	2	133	([6])	1	([6])	([6])
Lowell [7]	28	14.6	4	106	11.8	0	13.2	14.1
Lynn	26	13.2	2	56	9.7	4	10.5	11.3
Memphis	72	14.8	11	129	17.9	11	16.9	18.8
White	43		7	126		5		
Colored	29	([6])	4	135	([6])	6	([6])	([6])
Milwaukee	105	9.6	12	53	10.8	19	9.8	10.9
Minneapolis	107	12.0	11	72	12.9	8	10.8	10.8
Nashville	44	15.6	6	94	10.0	1	17.2	18.5
White	29		4	84		0		
Colored	15	([6])	2	124	([6])	1	([6])	([6])
New Bedford [7]	23	10.6	2	51	12.9	2	11.0	11.9
New Haven	51	16.3	2	31	12.2	4	12.6	13.4
New Orleans	187	21.3	20	111	23.6	21	17.5	17.9
White	118		11	93		10		
Colored	69	([6])	9	146	([6])	11	([6])	([6])
New York	1,432	10.7	119	50	11.8	150	10.7	11.3
Bronx Borough	210	8.6	11	32	10.0	20	7.8	8.3
Brooklyn Borough	403	8.1	42	44	10.5	63	9.6	10.2
Manhattan Borough	604	17.0	50	64	16.3	41	16.0	16.3
Queens Borough	179	8.5	15	60	8.1	20	7.1	7.7
Richmond Borough	36	11.9	1	19	14.2	6	13.8	15.9
Newark, N. J	104	12.2	10	52	10.9	6	11.9	12.7
Oakland	72	13.1	2	25	9.9	4	11.0	11.3
Oklahoma City	32	9.0	1	18	12.1	7	11.0	11.0
Omaha	54	13.1	6	73	11.8	0	13.5	13.5
Paterson	29	10.9	4	70	10.6	2	12.1	13.4
Philadelphia	415	11.0	29	43	11.9	46	12.5	13.1
Pittsburgh	199	15.5	17	60	13.1	22	13.8	14.8
Portland, Oreg	57	9.9	2	25	15.5	2	12.1	12.7
Providence	75	15.6	5	46	14.6	2	13.0	14.5
Richmond	56	15.9	6	87	18.0	9	14.9	16.8
White	35		4	88		3		
Colored	21	([6])	2	85	([6])	6	([6])	([6])
Rochester	73	11.7	6	53	10.5	3	11.6	12.3
St. Louis	212	13.4	11	38	14.0	15	14.0	14.6
St. Paul	53	10.2	1	10	15.7	1	10.1	10.7
Salt Lake City [5]	40	14.8	2	32	13.2	8	12.6	12.9
San Antonio	73	14.8	14		16.2	6	14.3	14.8
San Diego	40	14.0	4	84	13.5	4	14.5	15.1
San Francisco	134	11.1	5	34	9.4	8	13.2	13.0

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended December 27, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Dec. 27, 1930				Corresponding week 1929		Death rate for the 52 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1930	1929
Schenectady	19	10 3	3	93	10.9	4	11.0	12.1
Seattle	73	10.4	1	10	14.4	6	11.0	11.2
Somerville	20	10.0	3	95	8 6	1	9.7	9.3
Spokane	24	10.8	1	26	15.4	2	12 4	13.0
Springfield, Mass	36	12.5	5	86	13 7	2	12.1	12.7
Syracuse	54	13 6	3	37	13 0	3	11 7	12.9
Tacoma	23	11 2	0	0	11.3	1	12 4	11 7
Toledo	59	10 5	7	64	16.3	3	12.6	13.7
Trenton	25	10.6	5	96	19.2	4	16.5	17.1
Utica	29	14 7	3	83	16.3	0	14.5	15 5
Washington, D. C	137	14 7	8	47	15.1	9	15.2	15.4
White	88		3	26		4		
Colored	49	(6)	5	89	(6)	5	(6)	(6)
Waterbury	11	5 7	1	24	5.7	0	9.2	9.2
Wilmington, Del. [7]	37	18 4	2	48	9.9	1	14.7	13.7
Worcester	57	15.1	1	14	11.5	1	12 7	12.6
Yonkers	22	8 4	1	24	16 1	5	8.1	9.5
Youngstown	34	10.4	8	115	10.2	9	10.4	12.4

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 73 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25, Indianapolis, 11; Kansas City, Kans., 14, Knoxville, 15; Louisville, 17, Memphis, 38; Nahsville, 30, New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended January 3, 1931, and January 4, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended January 3, 1931, and January 4, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan. 3, 1931	Week ended Jan. 4, 1930	Week ended Jan. 3, 1931	Week ended Jan. 4, 1930	Week ended Jan. 3, 1931	Week ended Jan. 4, 1930	Week ended Jan. 3, 1931	Week ended Jan. 4, 1930
New England States:								
Maine	6	1	2	8	11	13	1	0
New Hampshire		3			76	5	0	0
Vermont	4				8	13	0	0
Massachusetts	75	108	4	11	451	288	1	6
Rhode Island	5	16		10		1	0	2
Connecticut	9	12	2	6	168	64	0	2
Middle Atlantic States:								
New York	139	129	[1] 68	[1] 20	120	314	8	18
New Jersey	93	133	26	32	178	105	2	2
Pennsylvania [2]	215	353			692	800	13	23
East North Central States.								
Ohio	84	98	26	24	53	538	9	7
Indiana	40	34	34		216	110	11	29
Illinois	135	234	22	31	457	299	7	10
Michigan	98	79	5		77	210	7	14
Wisconsin	22	20	6	35	158	493	0	1
West North Central States:								
Minnesota	12	18		2	15	151	3	1
Iowa	10	17			1	152	0	1
Missouri	43	43	12	19	983	60	3	9
North Dakota	10	7			15	47	0	4
South Dakota	5	5				3	0	1
Nebraska	6	13	17		8	211	0	2
Kansas	27	24	2	5	4	137	0	2
South Atlantic States.								
Delaware	6		4		3		0	0
Maryland [3]	18	36	11	42	57	6	1	0
District of Columbia	5	12		2	14	3	0	0
Virginia								
West Virginia	11	7	61	30	21	17	1	0
North Carolina	56	71	28	24	125	10	0	2
South Carolina	21	31	703	1,234			2	17
Georgia	15	30	85	156	78	39	19	4
Florida		9	4	2	42	13	2	0

[1] New York City only.
[2] Figures for 1930 are for 2 weeks.
[3] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended January 3, 1931, and January 4, 1930—Continued

Division and State	Diphtheria: Week ended Jan. 3, 1931	Diphtheria: Week ended Jan. 4, 1930	Influenza: Week ended Jan. 3, 1931	Influenza: Week ended Jan. 4, 1930	Measles: Week ended Jan. 3, 1931	Measles: Week ended Jan. 4, 1930	Meningococcus meningitis: Week ended Jan. 3, 1931	Meningococcus meningitis: Week ended Jan. 4, 1930
East South Central States:								
Kentucky	8	12			18	92	4	0
Tennessee	16	13	85	205	81	41	3	3
Alabama	30	32	60	173	233	7	1	0
Mississippi	23	29					1	4
West South Central States:								
Arkansas	13	15	89	108	2	196	0	3
Louisiana	50	22	48	34	1	30	1	5
Oklahoma [4]	29	54	69	160	21	44	1	4
Texas	49	48	14	45	101	8	1	0
Mountain States:								
Montana		2			3	10	1	3
Idaho			1		28	43	0	2
Wyoming		3	3		1	5	1	2
Colorado	9	9		1	40	18	1	1
New Mexico	4	17			40	5	0	1
Arizona	2	13	6	10	83	4	1	6
Utah [3]	6	3	1	4	5	60	1	4
Pacific States:								
Washington	11	8		12	27	77	1	7
Oregon	7	13	20	59	49	22	1	1
California	53	80	54	53	169	178	12	12

Division and State	Poliomyelitis: Week ended Jan. 3, 1931	Poliomyelitis: Week ended Jan. 4, 1930	Scarlet fever: Week ended Jan. 3, 1931	Scarlet fever: Week ended Jan. 4, 1930	Smallpox: Week ended Jan. 3, 1931	Smallpox: Week ended Jan. 4, 1930	Typhoid fever: Week ended Jan. 3, 1931	Typhoid fever: Week ended Jan. 4, 1930
New England States:								
Maine	3	0	24	41	0	0	4	3
New Hampshire	0	0	2	14	0	0	0	0
Vermont	0	0	1	14	3	6	1	0
Massachusetts	5	1	262	298	0	0	2	0
Rhode Island	0	0	22	28	0	0	0	4
Connecticut	0	0	57	84	0	0	2	0
Middle Atlantic States:								
New York	4	2	494	385	1	9	7	4
New Jersey	0	1	210	203	0	0	7	5
Pennsylvania [2]	3	3	601	773	0	3	13	29
East North Central States:								
Ohio	5	2	576	312	58	215	19	9
Indiana	0	0	213	154	98	204	1	2
Illinois	6	2	345	515	34	135	21	0
Michigan	3	0	358	280	52	64	8	0
Wisconsin	2	0	102	72	3	6	5	6
West North Central States:								
Minnesota	2	0	35	100	2	4	0	0
Iowa	1	0	62	98	23	90	1	0
Missouri	2	0	119	111	6	21	1	6
North Dakota	0	1	21	37	7	15	3	0
South Dakota	0	0	16	23	16	18	1	3
Nebraska	2	0	37	58	76	35	0	1
Kansas	1	0	41	132	52	29	3	3
South Atlantic States:								
Delaware	0	0	31	8	0	0	0	2
Maryland [3]	0	0	86	64	0	0	7	2
District of Columbia	3	0	30	16	0	0	0	0
Virginia						1		
West Virginia	0	0	39	31	8	7	2	8
North Carolina	0	0	75	65	1	11	3	10
South Carolina	1	2	11	21	0	3	5	8
Georgia	0	1	27	40	0	0	2	5
Florida	0	0	16	28	0	0	3	3
East South Central States:								
Kentucky	0	0	60	34	5	40	2	2
Tennessee	0	1	54	34	6	8	4	5
Alabama	0	0	64	42	1	2	8	2
Mississippi	0	0	25	8	5	3	7	5

[2] Figures for 1930 are for 2 weeks.
[3] Week ended Friday.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended January 3, 1931, and January 4, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Jan. 3, 1931	Week ended Jan. 4, 1930	Week ended Jan. 3, 1931	Week ended Jan. 4, 1930	Week ended Jan. 3, 1931	Week ended Jan. 4, 1930	Week ended Jan. 3, 1931	Week ended Jan. 4, 1930
West South Central States:								
Arkansas	0	0	12	15	8	14	5	1
Louisiana	2	0	17	14	6	0	6	7
Oklahoma [4]	1	0	51	56	56	90	11	10
Texas	0	0	35	32	11	31	10	4
Mountain States:								
Montana	0	0	39	40	18	11	0	1
Idaho	0	0	5	14	2	8	2	1
Wyoming	0	0	12	5	2	12	2	0
Colorado	0	0	35	35	4	15	0	1
New Mexico	0	1	5	5	1	2	1	2
Arizona	0	0	4	14	0	10	1	1
Utah [3]	2	0	3	10	0	2	2	1
Pacific States:								
Washington	0	1	41	60	22	69	5	1
Oregon	1	0	8	20	13	24	1	1
California	16	2	86	258	67	53	8	4

[3] Week ending Friday

[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
September, 1930										
Mississippi	3	87	482	5,308	61	615	9	44	5	127
November, 1930										
Arkansas	2	91	96	106	6	56	4	67	27	113
Georgia	1	141	372	225	40	20	0	191	0	79
Nevada					2				2	

September, 1930

	Cases
Mississippi:	
Chicken pox	218
Dengue	6
Dysentery (amebic)	49
Dysentery (bacillary)	780
Hookworm disease	269
Mumps	90
Ophthalmia neonatorum	16
Puerperal septicemia	32
Rabies in animals	6
Trachoma	6
Whooping cough	283

November, 1930

	Cases
Chicken pox:	
Arkansas	57
Georgia	116
Nevada	5
Dengue:	
Georgia	1
Dysentery:	
Georgia	19
Hookworm disease:	
Arkansas	1
Georgia	92
Mumps:	
Arkansas	22
Georgia	46
Nevada	14
Septic sore throat:	
Georgia	38
Tetanus:	
Georgia	2
Trichinosis:	
Georgia	3
Tularaemia:	
Nevada	1
Typhus fever:	
Georgia	13
Undulant fever:	
Georgia	2
Whooping cough:	
Arkansas	6
Georgia	55
Nevada	33

Cases of Certain Communicable Diseases Reported for the Month of September, 1930, by State Health Officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	12	7	105	66	28	0	46	24	146
New Hampshire		11			8	0		6	
Vermont	54	2	6	8	6	0	12	4	35
Massachusetts	117	166	142	90	244	0	406	48	517
Rhode Island	5	19	4	1	27	0	34	11	48
Connecticut	23	25	12	25	51	0	128	17	120
New York	242	241	241	254	306	10	1,774	249	1,367
New Jersey	91	206	73	32	150	0	433	67	297
Pennsylvania	245	379	245	174	474	0	601	396	776
Ohio	174	163	65	60	482	93	599	305	355
Indiana	34	58	9	4	128	73	217	54	56
Illinois	144	387	56	164	400	64	673	196	521
Michigan	118	164	82	48	344	22	375	117	518
Wisconsin	134	28	104	118	153	20	129	32	548
Minnesota	70	56	6		119	11	226	22	83
Iowa	23	17	10	18	94	36	22	19	40
Missouri	26	105	40	27	107	19	219	132	74
North Dakota	7	12	7	64	24	3	12	26	41
South Dakota	13	42	12	1	24	36	6	11	19
Nebraska	32	14	18	12	47	45	18	17	55
Kansas	30	45	20	27	131	10	119	49	107
Delaware	2	5	3	3	16	0	39	25	1
Maryland	31	45	12	17	60	0	[1] 226	211	113
District of Columbia	2	44	23		13	0	67	15	8
Virginia	74	150	92		186	9	109	213	204
West Virginia	10	81	45		108	15	38	240	65
North Carolina	39	456	18		321	2		166	325
South Carolina	26	267	7	28	57	0	94	169	114
Georgia	21	81	47	11	73	18	79	168	41
Florida	8	24	3		11	0	53	13	32
Kentucky [2]									
Tennessee	29	91	31	5	126	6	142	268	50
Alabama	18	107	30	15	116	5	377	117	75
Mississippi	218	87	61	90	44	5	231	127	283
Arkansas	15	21	1	23	43	5	[1] 22	134	45
Louisiana	4	108	12	1	57	4	[1] 153	134	20
Oklahoma [3]		94	10	2	64	25	27	171	14
Texas		76			38			58	
Montana	28	6	5	15	57	0	56	39	79
Idaho	1	16	12	7	22	6	7	7	52
Wyoming	2	4	1	1	15	0		3	11
Colorado	15	35	80	62	33	5	96	58	132
New Mexico	1	16	9	12	19	1	59	62	16
Arizona		25	11	4	23	1	122	27	33
Utah [2]									
Nevada	4						[1] 2	1	1
Washington	84	35	34	67	118	59	139	26	162
Oregon	28	9	85	84	38	5	51	26	63
California	264	130	192	367	176	42	835	73	408

[1] Pulmonary.
[2] Reports received weekly.
[3] Exclusive of Oklahoma City and Tulsa.

Case Rates per 1,000 Population (Annual Basis) for the Month of September, 1930, Based on Provisional Populations

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	0.18	0.11	1.00	1.00	0.43	0.00	0.70	0.36	2.22
New Hampshire		.29			.21	.00		.16	
Vermont	1.83	07	.20	27	.20	.00	.41	.14	1.19
Massachusetts	33	47	41	.26	.70	.00	1.16	.14	1.48
Rhode Island	09	.31	07	02	.48	.00	.60	.19	.85
Connecticut	.17	.19	.00	.19	.41	.00	.97	.13	.91
New York	23	23	23	.24	.29	.01	1.70	.24	1.31
New Jersey	.27	62	22	10	.45	.00	1.30	.20	.89
Pennsylvania	.31	.48	31	.22	.60	.00	.76	.50	.98
Ohio	.32	30	.12	.11	.88	.17	1.09	.56	.65
Indiana	.13	22	03	.02	.48	.27	.82	.20	.21
Illinois	23	.62	09	.26	.64	.10	1.07	.31	.83
Michigan	.29	41	.20	.12	.86	.05	.94	.29	1.29
Wisconsin	.56	12	.43	.49	.63	.08	.53	.13	2.27
Minnesota	33	27	03		.56	.05	1.07	.10	.30
Iowa	.11	.08	.05	.09	.46	.18	.11	.09	.20
Missouri	09	.35	13	.09	.36	.06	.73	.44	.25
North Dakota	.12	21	12	1.14	.43	.05	.21	.46	.73
South Dakota	23	74	.21	.02	42	.63	.11	.19	.33
Nebraska	28	.12	.16	11	.41	.40	.16	.15	.48
Kansas	.19	.29	13	.17	.85	06	.77	.32	.60
Delaware	.10	25	15	.15	.82	.00	1.99	1.27	.06
Maryland	.23	34	.09	.13	.45	.00	[1] 1.68	1.57	.84
District of Columbia	.05	1.10	57		.32	.00	1.67	.37	.20
Virginia	37	.78	46		.93	.05	.55	1.07	1.02
West Virginia	.07	.57	32		.76	.11	.27	1.68	.46
North Carolina	.15	1.74	.07		1.23	.01		.63	1.24
South Carolina	18	1.87	05	20	40	.00	.66	1.19	.80
Georgia	.09	34	20	.05	.31	.08	.33	.70	.17
Florida	.07	.20	02		.09	.00	.44	.11	.26
Kentucky [2]									
Tennessee	.13	.42	.14	.02	.59	.03	.66	1.25	.23
Alabama	.08	.49	.14	.07	.53	.02	1.73	.54	.34
Mississippi	1.32	.53	.37	.54	.27	.03	1.40	.77	1.71
Arkansas	.10	.14	.01	.15	.28	.03	[1].14	.88	.29
Louisiana	.02	.63	.07	.01	.83	.02	[1].89	.78	.12
Oklahoma [3]		.55	.06	.01	.38	.15	.16	1.01	.08
Texas		.16			.08			.12	
Montana	.64	14	.11	.34	1.29	.00	1.27	.88	1.79
Idaho	.03	.44	.33	.19	.60	.16	.19	.19	1.42
Wyoming	.11	.22	.05	.05	.81	.00		.16	.59
Colorado	.18	.41	.94	.73	.39	.06	1.13	.68	1.55
New Mexico	.03	.45	.26	.34	.54	.03	1.67	1.76	.45
Arizona		.69	.31	.11	.64	.03	3.39	.75	.92
Utah [2]									
Nevada	.53					.00	[1].27	.13	.13
Washington	.65	.27	.26	.52	.92	.46	1.08	.20	1.26
Oregon	.86	.11	1.08	1.07	.48	.06	.65	.33	.80
California	.56	.28	.41	.78	.37	.09	1.77	.16	.87

[1] Pulmonary.
[2] Reports received weekly.
[3] Exclusive of Oklahoma City and Tulsa.

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of November, 1930, by departments of health of certain States to other State health departments

Disease	Illinois	Kansas	Minnesota	Missouri	New York
Chicken pox	1				
Diphtheria			1		
Gonorrhea			1		
Poliomyelitis			1		
Smallpox	2				
Syphilis		7	1		
Trachoma			1		
Tuberculosis	17		39		
Typhoid fever	2			1	4

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 97 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 32,020,000. The estimated population of the 90 cities reporting deaths is more than 30,430,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended December 27, 1930, and December 28, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
45 States	980	1,588	
97 cities	450	724	1,055
Measles:			
44 States	2,795	3,133	
97 cities	1,138	551	
Meningococcus meningitis:			
45 States	88	197	
97 cities	41	91	
Poliomyelitis:			
46 States	53	23	
Scarlet fever:			
45 States	3,221	3,518	
97 cities	1,392	1,304	1,433
Smallpox:			
45 States	440	1,216	
97 cities	45	107	33
Typhoid fever:			
45 States	186	128	
97 cities	45	25	28
Deaths reported			
Influenza and pneumonia:			
90 cities	826	932	
Smallpox:			
90 cities	0	0	

City reports for week ended December 27, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	5	1	0	1	0	0	0	2
New Hampshire:								
Concord	0	0	0		0	0	0	0
Manchester	0	1	0		0	13	0	0
Vermont:								
Barre	1	0	0		0	0	0	0
Burlington	3	0	2		0	0	0	0
Massachusetts:								
Boston	61	41	13	3	1	45	8	26
Fall River	6	5	2		0	1	6	2
Springfield	8	5	2		0	4	1	3
Worcester	15	6	3	1	0	2	0	1
Rhode Island:								
Pawtucket	3	1	1		0	0	0	2
Providence	0	11	7		0	0	1	7
Connecticut:								
Bridgeport	1	7	1		0	0	1	3
Hartford	2	8	2		0	66	0	3
New Haven	8	1	0		0	8	7	0
MIDDLE ATLANTIC								
New York:								
Buffalo	30	17	7		0	7	21	22
New York	167	200	58	25	16	85	26	172
Rochester	12	8	0		1	1	2	3
Syracuse	26	4	1		0	2	2	1
New Jersey:								
Camden	6	6	3	1	1	21	3	3
Newark	37	21	13	3	1	3	7	9
Trenton	6	3	0		0	1	0	1
Pennsylvania:								
Philadelphia	91	73	11	3	2	24	18	36
Pittsburgh	78	23	10		1	7	8	29
Reading	10	3	0		0	4	12	1
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	11	14	1		2	5	10	11
Cleveland	100	41	7	4	2	6	28	12
Columbus	15	6	7	1	2	1	1	5
Toledo	72	11	10		0	2	4	5
Indiana:								
Fort Wayne	5	5	1		0	3	0	3
Indianapolis	25	8	6		1	3	3	19
South Bend	5	1	0		0	0	0	3
Terre Haute	2	1	0		0	1	0	3
Illinois:								
Chicago	71	126	96	8	2	14	27	50
Springfield	2	1	0		0	0	0	2
Michigan:								
Detroit	84	63	38	4	2	3	4	30
Flint	16	4	2		0	1	0	2
Grand Rapids	1	2	0		0	1	0	0

City reports for week ended December 27, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—con.								
Wisconsin:								
Kenosha	34	1	0		0	1	9	0
Madison	54	1	6			1	28	
Milwaukee	135	20	3	1	1	5	38	11
Racine	33	3	3		0	0	1	0
Superior	2	0	0		0	0	0	1
WEST NORTH CENTRAL								
Minnesota:								
Duluth	2	0	0		0	1	0	2
Minneapolis	20	18	6		1	9	4	11
St Paul	19	10	1	1	1	1	0	3
Iowa:								
Davenport	0	1	0			2	0	
Des Moines	2	3	1			0	1	
Sioux City	6	1	1			0	0	
Waterloo	15	0	0			0	0	
Missouri:								
Kansas City	21	8	7		0	3	7	8
St Joseph	1	2	0		0	0	0	3
St Louis	26	44	11			644	8	
North Dakota:								
Fargo	5	0	0		0	0	0	1
Grand Forks	0	0	0			0	0	
South Dakota:								
Sioux Falls	0	0	0			0	0	
Nebraska:								
Omaha	10	6	2		0	1	0	5
Kansas:								
Topeka	5	2	0	1	1	0	0	2
Wichita	1	3	0		0	0	0	4
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	1	0		0	0	0	5
Maryland:								
Baltimore	60	32	15	11	1	8	14	28
Cumberland	0	1	0		0	0	0	2
Frederick	0	1	0		0	0	1	0
District of Columbia,								
Washington	16	17	8	2	2	12	0	17
Virginia:								
Lynchburg	3	3	0		0	1	5	1
Norfolk	3	3	0		0	0	0	4
Richmond	1	7	3		2	16	1	3
Roanoke	5	2	0		1	0	0	1
West Virginia:								
Charleston	3	1	1		0	0	3	0
Wheeling	6	2	0		0	2	1	3
North Carolina:								
Raleigh	1	1	1		0	0	0	0
Wilmington	20	1	0		0	0	0	2
Winton-Salem	2	2	1		0	0	3	4
South Carolina:								
Charleston	4	1	0	24	3	0	0	2
Columbia	6	0	0		0	0	0	8
Greenville	2		0		0	0	0	0
Georgia:								
Atlanta	1	5	13	10	1	17	0	6
Brunswick	0	0	0		0	0	0	0
Savannah	0	1	0	2	1	0	0	4
Florida:								
Miami	1	3	2		0	0	0	1
St. Petersburg		1			0			2
Tampa	1	2	1		1	6	0	1

City reports for week ended December 27, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	1	0	...	0	0	0	0
Tennessee:								
Memphis	35	6	5	...	1	1	0	9
Nashville	2	2	1	...	0	6	0	6
Alabama:								
Birmingham	3	5	7	4	2	47	0	5
Mobile	1	1	1	...	0	0	0	3
Montgomery	0	1	0	...	...	0	0	...
WEST SOUTH CENTRAL								
Arkansas:								
Forth Smith	0	1	0	...	...	0	0	...
Little Rock	0	1	0	...	0	0	0	1
Louisiana								
New Orleans	0	13	8	4	6	0	0	20
Shreveport	0	1	3	...	0	5	1	4
Oklahoma.								
Tulsa	9	4	5	...	...	7	1	...
Texas.								
Dallas	7	13	8	...	1	2	0	4
Forth Worth	10	5	0	...	0	0	0	11
Galveston	0	0	1	...	0	0	0	3
Houston	0	7	12	...	1	0	1	9
San Antonio	4	5	9	...	1	0	0	12
MOUNTAIN								
Montana:								
Billings	1	0	0	...	0	0	0	3
Great Falls	3	2	0	...	0	1	1	0
Helena	0	0	0	...	0	0	0	0
Missoula	0	0	0	...	0	0	1	0
Idaho:								
Boise	1	0	0	...	0	0	0	1
Colorado:								
Denver	41	9	6	...	0	6	9	16
Pueblo	2	1	0	...	0	16	0	1
New Mexico:								
Albuquerque	1	1	0	...	0	0	0	2
Arizona:								
Phoenix	0	1	0	...	0	0	0	2
Utah:								
Salt Lake City	...	3	...	...	...	...	...	...
Nevada:								
Reno	0	0	0	...	0	0	0	0
PACIFIC								
Washington:								
Seattle	12	5	3	...	...	1	12	...
Spokane	15	2	0	...	...	2	0	...
Tacoma	3	3	4	...	0	0	0	3
Oregon:								
Portland	7	11	0	1	0	2	11	6
Salem	1	0	0	...	0	0	2	0
California:								
Los Angeles	20	40	12	25	4	5	2	40
Sacramento	5	2	1	1	0	0	4	5
San Francisco	9	17	0	2	3	0	0	6

City reports for week ended December 27, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	2	7	0	0	0	0	0	0	0	13	23
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	11
Manchester	2	1	0	0	0	0	0	0	0	0	10
Vermont:											
Barre	0	2	0	0	0	0	0	0	0	1	2
Burlington	1	0	0	0	0	0	0	0	0	1	7
Massachusetts:											
Boston	73	60	0	0	0	10	1	0	0	24	209
Fall River	3	5	0	0	0	1	0	0	0	0	18
Springfield	9	9	0	0	0	2	0	0	0	1	35
Worcester	11	23	0	0	0	2	0	0	0	7	57
Rhode Island:											
Pawtucket	1	0	0	0	0	0	0	0	0	0	17
Providence	9	14	0	0	0	1	0	0	0	1	75
Connecticut:											
Bridgeport	9	8	0	0	0	3	0	1	0	1	22
Hartford	7	6	0	0	0	2	0	0	0	1	24
New Haven	5	3	0	0	0	1	0	0	0	6	51
MIDDLE ATLANTIC											
New York:											
Buffalo	27	23	0	0	0	5	1	0	0	17	134
New York	193	140	0	0	0	94	8	2	0	98	1,512
Rochester	9	49	0	0	0	2	1	0	0	10	67
Syracuse	12	13	0	0	0	2	0	1	0	6	54
New Jersey:											
Camden	6	6	0	0	0	0	0	0	0	2	19
Newark	22	17	0	0	0	4	0	1	0	12	106
Trenton	4	10	0	0	0	0	0	0	0	1	25
Pennsylvania:											
Philadelphia	84	117	0	0	0	20	2	1	1	16	415
Pittsburgh	37	37	0	0	0	10	0	1	0	6	199
Reading	3	1	0	0	0	0	0	0	0	0	22
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	16	33	0	0	0	10	1	11	0	0	123
Cleveland	40	46	0	0	0	10	0	0	0	8	189
Columbus	11	13	0	0	0	4	0	0	0	0	87
Toledo	14	7	0	1	0	5	0	0	0	2	59
Indiana:											
Fort Wayne	4	0	0	2	0	0	0	0	0	1	37
Indianapolis	10	43	0	0	0	7	0	2	0	11	--
South Bend	3	3	0	1	0	1	0	0	0	1	18
Terre Haute	3	4	1	0	0	1	0	0	0	0	23
Illinois:											
Chicago	120	206	0	0	0	41	2	6	0	22	656
Springfield	2	2	0	0	0	0	0	0	0	0	26
Michigan:											
Detroit	96	58	2	1	0	28	1	0	0	41	298
Flint	12	16	0	0	0	2	0	0	0	7	19
Grand Rapids	11	13	0	0	0	1	0	1	0	2	30
Wisconsin:											
Kenosha	3	4	0	0	0	0	0	0	0	2	9
Madison	3	6	0	0	----	----	0	0	----	----	----
Milwaukee	30	10	0	0	0	5	0	0	0	20	105
Racine	6	7	0	0	0	1	0	0	0	6	10
Superior	3	2	0	0	0	0	0	0	0	1	11
WEST NORTH CENTRAL											
Minnesota:											
Duluth	11	1	0	0	0	1	0	0	0	0	26
Minneapolis	62	4	1	0	0	1	1	0	0	0	107
St. Paul	28	4	1	0	0	1	0	0	0	5	56

City reports for week ended December 27, 1930—**Continued**

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—con.											
Iowa:											
Davenport	2	1	0	2	-	-	0	0	-	0	-
Des Moines	10	5	1	4	-	-	0	0	-	0	32
Sioux City	2	18	0	0	-	-	0	0	-	0	-
Waterloo	2	0	0	1	-	-	0	0	-	0	-
Missouri:											
Kansas City	14	8	3	0	0	5	0	1	0	1	89
St Joseph	2	0	0	0	0	1	0	0	0	0	25
St. Louis	35	73	1	0	0	6	1	2	0	5	212
North Dakota:											
Fargo	1	2	0	0	0	0	0	0	0	0	4
Grand Forks	1	0	0	0	-	-	0	0	-	0	-
South Dakota:											
Sioux Falls	2	0	0	11	-	-	0	0	-	0	8
Nebraska:											
Omaha	5	15	2	16	0	0	0	0	0	3	54
Kansas:											
Topeka	2	0	0	0	0	0	0	0	0	0	13
Wichita	4	2	0	5	0	2	0	0	0	1	29
SOUTH ATLANTIC											
Delaware:											
Wilmington	3	2	0	0	0	0	0	1	0	0	37
Maryland:											
Baltimore	30	25	0	0	0	7	2	0	0	0	214
Cumberland	0	2	0	0	0	1	0	0	0	0	17
Frederick	0	0	0	0	0	1	0	0	0	0	2
Dist. of Columbia:											
Washington	23	23	0	0	0	9	0	2	0	1	137
Virginia:											
Lynchburg	0	1	0	0	0	1	0	3	0	0	13
Norfolk	3	3	0	0	0	2	0	0	0	2	-
Richmond	6	14	0	0	0	4	0	0	0	2	56
Roanoke	3	2	0	0	0	0	0	0	0	0	19
West Virginia:											
Charleston	2	0	0	0	0	0	0	0	0	1	21
Wheeling	2	1	0	0	0	0	0	0	0	0	22
North Carolina:											
Raleigh	1	0	0	0	0	1	0	0	0	3	11
Wilmington	0	0	0	0	0	1	0	0	0	2	12
Winston-Salem	2	2	0	0	0	1	0	0	0	0	19
South Carolina:											
Charleston	0	2	0	0	0	4	0	0	0	0	41
Columbia	0	2	0	0	0	1	0	0	0	0	25
Greenville	-	1	-	0	0	0	-	0	0	0	-
Georgia											
Atlanta	5	13	1	0	0	7	0	2	0	1	85
Brunswick	0	0	0	0	0	1	0	0	0	0	5
Savannah	2	0	0	0	0	2	1	0	0	0	24
Florida:											
Miami	2	5	0	0	0	0	0	0	0	2	20
St. Petersburg	0	-	0	-	0	0	0	-	0	-	11
Tampa	2	0	1	0	0	1	0	0	0	0	18
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	8	0	0	0	1	0	0	0	0	20
Tennessee:											
Memphis	6	24	1	0	0	2	0	0	0	0	72
Nashville	3	6	0	0	0	2	0	3	0	0	44
Alabama:											
Birmingham	2	16	0	0	0	5	1	0	0	0	70
Mobile	0	0	0	0	0	1	0	0	0	0	29
Montgomery	0	3	0	0	-	-	0	0	-	0	-

City reports for week ended December 27, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0			0	0		0	
Little Rock	2	3	0	0	0	0	0	0	0	0	
Louisiana:											
New Orleans	7	5	0	1	0	14	3	0	0	0	187
Shreveport	2	2	0	0	0	1	0	0	0	0	32
Oklahoma:											
Tulsa	2	6	1	5			0	0		0	
Texas:											
Dallas	6	5	0	1	0	2	0	0	0	1	64
Fort Worth	1	6	1	0	0	2	0	0	0	0	36
Galveston	0	0	0	0	0	0	0	0	1	0	15
Houston	3	2	1	2	0	3	0	0	0	0	70
San Antonio	2	0	0	1	0	7	0	0	0	0	73
MOUNTAIN											
Montana:											
Billings	1	0	0	4	0	1	0	0	0	3	10
Great Falls	3	8	0	0	0	0	0	0	0	3	5
Helena	0	0	0	0	0	0	0	0	0	0	4
Missoula	1	0	0	0	0	0	0	0	0	16	3
Idaho:											
Boise	2	0	0	0	0	1	0	0	0	0	8
Colorado:											
Denver	12	28	0	0	0	5	0	1	0	16	92
Pueblo	1	0	1	0	0	0	0	0	0	3	9
New Mexico:											
Albuquerque	0	0	0	0	0	2	0	0	0	0	11
Arizona:											
Phoenix	0	0	0	0	0	2	0	0	0	0	11
Utah:											
Salt Lake City	1		1				0				
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	4
PACIFIC											
Washington:											
Seattle	8	9	1	0			1	1		15	
Spokane	7	4	4	2			0	0		0	
Tacoma	3	6	4	4	0	1	0	0	0	0	23
Oregon:											
Portland	7	1	8	2	0	0	0	0	0	11	57
Salem	0	0	0	0	0	0	0	0	0	0	
California:											
Los Angeles	31	15	1	4	0	18	1	2	0	2	384
Sacramento	2	1	1	0	0	3	0	0	0	2	31
San Francisco	17	7	1	0	0	8	0	0	0	6	154

City reports for week ended December 27, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	1	1
Massachusetts:									
Boston	2	0	0	0	0	0	0	2	0
Springfield	0	0	1	0	0	0	0	0	0
Worcester	1	0	0	0	0	0	0	5	0
MIDDLE ATLANTIC									
New York:									
New York	4	5	0	1	0	0	1	1	1
New Jersey:									
Newark	1	1	1	1	0	0	0	0	0
Pennsylvania:									
Philadelphia	1	1	0	0	0	0	0	0	0
Pittsburgh	2	1	0	0	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	0	0	0	0	0	0	0	0
Cleveland	0	0	1	0	0	0	0	0	0
Columbus	0	0	1	1	0	0	0	0	0
Indiana:									
Indianapolis	2	1	0	0	0	0	0	0	0
Illinois:									
Chicago	5	1	0	1	0	0	1	3	1
Michigan:									
Detroit	6	2	0	0	0	0	0	0	1
Flint	0	1	0	0	0	0	0	0	0
Wisconsin:									
Madison	1	0	0	0	0	0	0	0	0
Milwaukee	2	0	0	0	0	0	0	0	0
Racine	0	0	1	1	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	1	0	0	0	0	0	0	0	0
Iowa:									
Davenport	1	0	0	0	0	0	0	0	0
Missouri:									
St. Louis	2	0	0	0	0	0	0	0	0
Nebraska:									
Omaha	2	0	0	0	0	0	0	0	0
SOUTH ATLANTIC [1]									
District of Columbia:									
Washington [1]	1	1	0	0	0	0	0	1	0
West Virginia:									
Charleston	1	1	0	0	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	0	2	0	0	0
Wilmington	0	0	0	0	0	1	0	0	0
South Carolina:									
Charleston	0	0	0	1	2	0	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	1	0	0	0	0	0	0	0	0
Alabama:									
Birmingham	0	0	0	1	1	0	0	1	0
Montgomery	0	0	0	0	1	0	0	0	0

[1] *Typhus fever*: 4 cases; 1 case at Baltimore, Md.; 1 case at Washington, D. C.; and 2 cases at Savannah, Ga.

City reports for week ended December 27, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	0	0	0	0	2	2	0	1	1
Shreveport	0	0	0	0	0	2	0	1	0
Oklahoma:									
Tulsa	1	0	0	0	0	0	0	0	0
Texas:									
Dallas	0	0	0	0	1	2	0	0	0
Fort Worth	0	0	0	0	0	1	0	0	0
Galveston	0	0	0	0	0	1	0	0	0
Houston	0	0	0	0	0	3	0	0	0
MOUNTAIN									
Colorado.									
Denver	2	1	0	0	0	0	0	0	0
Arizona:									
Phoenix	0	2	0	0	0	0	0	0	0
PACIFIC									
Oregon:									
Portland	0	0	0	0	0	0	0	1	0
California:									
Los Angeles	2	0	0	0	0	0	1	2	0
San Francisco	2	2	0	0	1	0	0	3	0

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended December 27, 1930, compared with those for a like period ended December 28, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities November 23 to December 27, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929	Dec. 27, 1930	Dec. 28, 1929
98 cities	89	139	[2] 92	146	[3] 90	134	[4] 96	128	[5] 73	120
New England	80	177	111	112	117	117	[6] 130	168	69	126
Middle Atlantic	50	123	61	110	50	112	65	106	49	113
East North Central	123	167	118	191	[7] 122	170	[8] 120	167	103	167
West North Central	108	114	99	121	95	148	87	110	53	67
South Atlantic	60	144	[9] 104	127	[9] 113	107	[9] 91	107	79	79
East South Central	155	157	162	226	155	137	94	123	94	109
West South Central	164	259	[10] 159	362	[11] 147	203	[10] 219	225	153	171
Mountain	77	17	[12] 0	157	26	61	17	61	[5] 67	35
Pacific	111	56	76	84	64	58	97	56	47	82

MEASLES CASE RATES

	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929	Dec. 27, 1930	Dec. 28, 1929
98 cities	109	74	[2] 146	98	[3] 167	113	[4] 194	109	[5] 185	91
New England	148	70	202	81	250	85	[6] 173	92	279	90
Middle Atlantic	73	33	89	54	89	47	91	59	74	51
East North Central	28	101	28	93	[7] 27	133	[8] 29	94	28	97
West North Central	636	100	933	210	1,055	202	1,387	210	1,250	146
South Atlantic	40	22	[9] 57	4	[9] 74	28	[9] 128	39	114	30
East South Central	74	0	175	14	337	14	310	0	364	0
West South Central	11	38	[10] 12	46	[11] 8	61	[10] 20	133	26	88
Mountain	275	131	[12] 51	165	146	104	163	139	[5] 258	78
Pacific	12	249	31	377	31	464	7	418	19	326

SCARLET FEVER CASE RATES

	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929	Dec. 27, 1930	Dec. 28, 1929
98 cities	178	212	[2] 207	252	[3] 229	277	[4] 236	249	[5] 227	216
New England	241	258	246	276	237	375	[6] 312	310	323	299
Middle Atlantic	156	116	187	148	196	172	219	176	200	165
East North Central	224	361	259	409	[7] 318	438	[8] 300	355	288	311
West North Central	137	183	194	231	205	271	273	235	241	179
South Atlantic	172	139	[9] 211	159	[9] 241	193	[9] 193	253	163	144
East South Central	243	137	337	144	425	89	223	48	385	75
West South Central	142	118	[10] 100	156	[11] 94	137	[10] 80	99	64	122
Mountain	223	348	[12] 120	392	206	322	292	583	[5] 404	322
Pacific	97	266	113	355	83	340	97	244	99	246

SMALLPOX CASE RATES

	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929	Dec. 27, 1930	Dec. 28, 1929
98 cities	8	14	[2] 7	19	[3] 15	23	[4] 9	23	[5] 7	18
New England	0	0	0	0	0	2	[6] 0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	4	13	1	26	[7] 3	29	[8] 6	31	3	20
West North Central	66	48	47	64	120	56	47	60	42	58
South Atlantic	0	0	[9] 0	0	[9] 0	0	[9] 0	0	0	2
East South Central	0	0	0	0	0	0	0	7	0	7
West South Central	4	11	[10] 4	19	[11] 8	34	[10] 16	34	19	27
Mountain	34	35	[12] 205	78	146	78	112	52	[5] 45	44
Pacific	9	75	12	60	7	118	12	113	24	77

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930, and 1929, respectively.

[2] Raleigh, N. C., Shreveport, La., and Denver, Colo., not included.

[3] South Bend, Ind., Raleigh, N. C., Fort Smith, Ark., and Shreveport, La., not included.

[4] Hartford, Conn., Grand Rapids, Mich., Raleigh, N. C., and Shreveport, La., not included.

[5] Salt Lake City, Utah, not included.

[6] Hartford, Conn., not included.

[7] South Bend, Ind., not included.

[8] Grand Rapids, Mich., not included.

[9] Raleigh, N. C., not included.

[10] Shreveport, La., not included.

[11] Fort Smith, Ark., and Shreveport, La., not included.

[12] Denver, Colo., not included.

Summary of weekly reports from cities November 23 to December 27, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929	Dec. 27, 1930	Dec. 28, 1929
98 cities	10	5	[2] 10	5	[3] 8	6	[4] 9	5	[5] 7	4
New England	11	2	7	2	18	7	[6] 10	0	2	2
Middle Atlantic	3	2	8	4	7	6	3	4	3	3
East North Central	4	5	10	4	[7] 7	3	[8] 10	3	13	1
West North Central	8	0	6	2	6	6	8	8	6	2
South Atlantic	29	4	[9] 17	6	[9] 4	7	[9] 11	4	15	9
East South Central	13	34	13	48	20	14	40	0	20	34
West South Central	75	15	[10] 28	0	[11] 25	8	[10] 28	38	0	8
Mountain	9	26	[12] 17	26	0	9	9	17	[5] 11	0
Pacific	7	2	12	10	7	7	7	2	7	10

INFLUENZA DEATH RATES

	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929	Dec. 27, 1930	Dec. 28, 1929
91 cities	9	11	[2] 10	17	[13] 10	16	[4] 10	19	[5] 12	19
New England	2	4	4	11	4	7	[6] 2	9	2	9
Middle Atlantic	11	5	6	14	8	9	5	18	11	13
East North Central	7	10	8	9	[7] 5	15	[8] 10	14	8	13
West North Central	0	21	12	27	21	12	15	15	9	15
South Atlantic	9	17	[9] 19	28	[9] 22	19	[9] 19	13	22	26
East South Central	29	15	15	60	29	60	37	52	22	30
West South Central	15	55	[10] 37	47	[10] 12	78	[10] 25	66	34	94
Mountain	26	17	[12] 34	17	9	0	17	26	[5] 0	26
Pacific	9	13	3	13	9	19	12	28	21	19

PNEUMONIA DEATH RATES

	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929	Dec. 27, 1930	Dec. 28, 1929
91 cities	112	106	[2] 102	136	[13] 108	150	[4] 115	158	[5] 130	143
New England	71	92	66	74	109	135	[6] 108	157	109	94
Middle Atlantic	125	101	107	139	109	156	133	165	132	155
East North Central	78	84	78	126	[7] 85	116	[8] 70	117	95	116
West North Central	92	126	130	126	145	174	95	180	115	174
South Atlantic	165	129	[9] 143	131	[9] 121	191	[9] 128	184	159	152
East South Central	155	224	177	239	140	216	125	216	184	194
West South Central	165	156	[10] 139	238	[10] 176	230	[10] 147	234	203	234
Mountain	223	157	[12] 137	165	154	192	215	235	[5] 235	209
Pacific	86	104	74	138	74	107	156	138	166	104

[2] Raleigh, N. C., Shreveport, La., and Denver, Colo., not included.
[3] South Bend, Ind., Raleigh, N. C., Fort Smith, Ark., and Shreveport, La., not included.
[4] Hartford, Conn., Grand Rapids, Mich., Raleigh, N. C., and Shreveport, La., not included.
[5] Salt Lake City, Utah, not included.
[6] Hartford, Conn., not included.
[7] South Bend, Ind., not included.
[8] Grand Rapids, Mich., not included.
[9] Raleigh, N. C., not included.
[10] Shreveport, La., not included.
[11] Fort Smith, Ark., and Shreveport, La., not included.
[12] Denver, Colo., not included.
[13] South Bend, Ind., Raleigh, N. C., and Shreveport, La., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended December 27, 1930.—The Department of Pensions and National Health reports cases of certain communicable diseases from eight Provinces of Canada for the week ended December 27, 1930, as follows:

Province	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]				
Nova Scotia				1
New Brunswick				1
Quebec	43			7
Ontario				20
Manitoba				1
Saskatchewan		1		1
British Columbia			5	6
Total	43	1	5	37

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended December 27, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended December 27, 1930, as follows:

Disease	Cases	Disease	Cases
Chicken pox	54	Ophthalmia neonatorum	1
Diphtheria	31	Puerperal septicemia	2
Erysipelas	9	Scarlet fever	79
German measles	1	Tuberculosis	81
Influenza	43	Typhoid fever	7
Measles	46	Whooping cough	29
Mumps	14		

DENMARK

Communicable diseases—October, 1930.—During the month of October, 1930, cases of certain communicable diseases were reported in Denmark, as follows:

Disease	Cases	Diseases	Cases
Cerebrospinal meningitis	5	Paratyphoid fever	12
Chicken pox	14	Poliomyelitis	13
Diphtheria and croup	510	Puerperal fever	20
Erysipelas	363	Scabies	1,016
German measles	1	Scarlet fever	223
Influenza	4,175	Tetanus	1
Lethargic encephalitis	7	Typhoid fever	6
Measles	1,082	Undulant fever (Bac. abort. Bang)	43
Mumps	248	Whooping cough	1,782

ITALY

Communicable diseases—Four weeks ended August 10, 1930.—During the four weeks ended August 10, 1930, cases of certain communicable diseases were reported in Italy as follows:

Disease	July 14-20, 1930		July 21-27, 1930		July 28-Aug. 3, 1930		Aug. 4-10, 1930	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	29	28	41	35	31	29	25	23
Cerebrospinal meningitis	10	9	14	12	10	7	7	6
Chicken pox	82	52	60	36	36	30	53	42
Diphtheria and croup	281	182	280	177	314	196	337	223
Dysentery	81	28	45	17	81	28	78	27
Lethargic encephalitis			4	3	3	2	7	6
Measles	1,340	328	1,092	287	835	265	741	246
Poliomyelitis	14	9	15	13	8	7	15	13
Scarlet fever	273	123	242	109	261	126	250	104
Typhoid fever	911	417	903	434	974	463	1,137	539

PANAMA CANAL ZONE

Communicable diseases—November, 1930.—During the month of November, 1930, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	6		Measles	34	1
Diphtheria	8		Pneumonia		22
Dysentery (amoebic)	10		Tuberculosis		31
Leprosy		1	Typhoid fever	5	
Malaria	116	2	Whooping cough	5	

TRINIDAD (BRITISH WEST INDIES)

Port of Spain—Vital statistics—November, 1929 and 1930.—The following statistics for the month of November, 1929 and 1930, are taken from a report issued by the Public Health Department of Port of Spain, Trinidad:

	November			November	
	1929	1930		1929	1930
Number of births	182	190	Deaths under 1 year	9	22
Birth rate per 1,000 population	33.4	34.3	Infant mortality rate per 1,000 births	49.5	115.8
Number of deaths	94	90			
Death rate per 1,000 population	17.2	16.3			

YUGOSLAVIA

Communicable diseases—November, 1930.—During the month of November, 1930, certain communicable diseases were reported in Yugoslavia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	62	3	Puerperal septicemia	7	3
Cerebrospinal meningitis	11	8	Rabies	1	1
Diphtheria and croup	1,633	189	Scarlet fever	1,408	203
Dysentery	44	12	Tetanus	26	14
Erysipelas	190	8	Typhoid fever	603	84
Leprosy	1		Typhus fever	2	
Measles	1,185	15			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		June 29–July 26, 1930	July 27–Aug 23, 1930	Aug. 24–Sept. 20, 1930	Sept 21–Oct 18, 1930	Week ended— Oct. 25, 1930	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27	Jan. 3, 1931
Afghanistan	C	P	P													
China:																
Amoy	C			2												
	D			2												
Canton	C	2			1	1										
	D	1														
Shanghai	C			34	38	1		1								
	D			3	4											
Shensi Province	C			P												
Swatow	C		3	2												
Tientsin	C		2	1												
India	C	25,121	42,893	51,551	38,529	5,222	5,689	4,146								
	D	13,822	22,358	23,959	17,635	2,733	2,915	2,149								
Bassein	C			1												
Bombay	C		14	1	16	17	1	1		2	2	4	5			
	D		8	2	11	10	6	1		2	1	1	3			
Calcutta	C	220	63	27	24	7	7	11	8	4	6	2	10			
	D	128	30	12	15	4	2	6	4	4	4	1	7			
Madras	C		1		2		1									
	D		1		2											
Rangoon	C	1	1	2	1											
	D	1	1	1	1											
Tuticorin	C				1				1	4		1				
	D				1				1							
India (French):																
Chandernagor	C	1		1	3						1					
	D				1											
Pondicherry	C				1				1	1	1	1	1			
	D				1					1	1	1	1			
India (Portuguese)	C		1	1			3	9	2							
	D			1			3	5	1							

Indo-China (see also table below):																
Pnompenh	C	32	11		2	1					1	1				
	D	22	6								1	1				
Saigon and Cholon	C	10	5		2	1					1		2	1		
	D	3	1								1					
Philippine Islands: [1]																
Ports—																
Cebu	C	65	9	2												
	D	36	8	2												
Iloilo	C	29	61	10	1						1					1
	D	22	56	14	4						3					1
Manila	C		1	43	5											
	D			12	1											
Provinces—																
Antique	C		20	47	40											
	D		12	34	18											
Bohol	C		138	49												
	D		79	20												
Bulacan	C	4	1	4	2											
	D			2	1											
Capiz	C	3	2	1												
	D	2	2													
Cebu	C	713	85	25												
	D	303	50	11												
Iloilo	C	309	571	238	50	10	10	4	6	11	21	13		7	5	13
	D	193	376	151	40	7	7	3	6	8	11	8		6	4	10
La Union	C	1														
Leyte	C	1														
	D	11														
Masbate	C	92	34													
	D	35	14													
Misamis, Occidental	C	3														
	D	3														
Negros, Occidental	C	568	343	122	28	12	3	19	22	44	38	48	33	28	19	33
	D	368	237	91	20	12	3	12	14	33	17	45	28	22	16	26
Negros, Oriental	C	23	8													
	D	13	4													
Nueva Acija	C	1														
	D	1														
Pampanga	C	2		1												
Pangasinan	C	3	1													
	D	2	1													
Rizal	C	1														
	D							4								
Samar	C		18	4	7	6	3	4	3	4	4			2		12
	D		16	2	7	5	1	4	2	4	4			1	1	7
Sorsogon	C							5								
	D	1						4								

[1] Figures for cholera in the Philippines Islands are subject to correction.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths, P, present]

Place		June 29–July 26, 1930	July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Week ended— Oct. 25, 1930	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27	Jan. 3, 1931
Philippine Islands—Continued.																
Provinces—Continued.																
Surigao	C		28	1	(2)											
	D		17	2												
Tarlac	C		1													
Siam	C	20	3		4	3		1			1	1				
	D	9	2		1	3		1				1				
Bangkok	C	8	1		3	1	2			2	1		1	2		
	D	3	1		2	1	1			2	1		1	2		
Songkla	C	10														
	D	6														
On vessel: S. S. Malwa from Shanghai	D			1												

[2] During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, P. I.

PLAGUE

Place		June 20–July 26, 1930	July 27–Aug 23, 1930	Aug. 24–Sept 20, 1930	Week ended— Sept. 27, 1930	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27
Algeria:																		
Algiers	C	3	7	11	1	1	2	2	5	3	1	2			1	1		
	D								3									
Constantine	C	1									1							
Oran	C	3	4	10		4	4	2	1			1						
	D			1			2	1										
Plague-infected rats		2		10	2			4	1									
Philippeville	C			1	1		1	1	1		1							
Argentina. Cordoba Province—Charon	C															1		
Belgian Congo	C	2	2	5								1				1		
	D	2	2	5								1				1		
British East Africa (see also table below): Uganda	C	228	236	202	65	18	32	70	53	37								
	D	213	220	191	65	18	32	49	53	36								
Canary Islands: Las Palmas	D		1															
Ceylon:																		
Colombo	C	3	2	2	1	1		1				1	1		4	4		
	D	3	2	3	1	1		1				1	1		3	4		
Plague-infected rats		1										1	1	1				
China:																		
Manchuria—Tunghau and Nungan	C		30	29	2													
Shensi	C			P					P									
Dutch East Indies																		
Batavia and West Java	C	94	83	79	22	14	26	45	41	36	27	33	53					
	D	84	83	76	22	14	25	41	42	37	28	34	53					
Plague-infected rats			1	3														
Java and Madura	D	217	[illegible]	[illegible]	75	68	97	97	124	140	107	139						
Egypt:																		
Alexandria	C	23	11	10	2	1	2	2	2	1	1	3		1		2	1	1
	D	10	6	8	3	1	1	1	3		2	2				1		
Assiout	C	2									3			2		7	5	1
	D	2									1					1		
Aswan	C													3				
Beni-Suef	C		1															
Gharbieh	C		3															
	D		1															
Girga	C	1		1													3	1
	D																	1
Minieh	C	3														1		
Port Said	C	1	1						1	1								

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		June 29–July 26, 1930	July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930				November, 1930					December, 1930			
						4	11	18	25	1	8	15	22	29	6	13	20	27
France:																		
Marseille	C			5				4	2	1		1						
St. Ouen	C	1																
	D	1																
Gambia	C		4															
	D		4															
Greece (see also table below):																		
Patras	C	1																
Pyrgos	C					2												
India	C	377	877	2,497	672	527	627	545	604	616	558							
	D	256	477	1,132	289	222	269	288	336	288	317							
Bassein	C			2						1								
	D			3														
Bombay	C	1		1	1			1	1									
	D	1		1		1		1		1								
Plague-infected rats		52	35	47	21	13	16	14	2	9	11	8	11	5	12	4		
Madras Presidency	C	47	81	127	41	59	46	50	69	31	45	40						
	D	31	34	57	14	32	31	33	43	22	37	22						
Rangoon	C	2	3	10	2					1		1						1
	D	2	2	9	2					1								1
Plague-infected rats		6	7	8		1			1				1	1			1	
India (Portuguese)	D		P							3								
Indo-China (see also table below):																		
Pnompenh	C	2	4	3	1	1							1	3	1	1		
	D	2			1	1	1		1				1	3	1	1		
Saigon and Cholon	C		1	1	1													
Iraq: Baghdad	C	18	9		1							P	2	2				
	D	7	3		1								1	1				
Kwang-Chow-Wan	C	4	1															
Madagascar (see also table below): Tamatave	C	1	2	1		1			3		2			2	1	1		
	D					1			3					2		1		
Morocco	C	1	15						4		1						1	
	D		2															

Nigeria: Lagos	C	1	7	6		3		2	33	1	2	2	4	3	2			
	D	1	7	6		3		2		1	2	2	4	3	2			
Plague-infected rats		18	8	10				11	3	1	2	7	1					
Senegal (see table below).																		
Siam	C		7	3			1		3	1	1	1						1
	D		6	2					3	1		1						1
Bangkok	C		3									1				1		
	D		2									1				1		
Nagara Rajsima	C		2	1				1				1						
	D		2	1				1				1				8		
Syria: Beirut	C	9	2	5					1	1	3	1						
Tripolitania	C		2										4	6	2			
Tunisia:																		
Sfax district	C	6	1															
Tunis	C	5								1		1				P	12	
	D	1																
Union of Socialist Soviet Republics: Salsk Region	C	5	7															
	D	4	5															
Union of South Africa:																		
Cape Province	C	1	1	1					1									
	D	1	1	1														
Orange Free State	C			2														
	D			2														

Place		June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930
British East Africa (see also table above):							
Kenya	C	107	97	87	53	58	14
Greece (see also table above)	C	1				2	
Indo-China (see also table above)	C	11	1	2	4		
Madagascar (see also table above):							
Antsirabe Province	C	3	24	11	21		
	D	3	24	11	21		
Miarinarivo Province	C	1	1	2	7		
	D	1	1	2	7		
Moramanga Province	C	3		27	18		
	D	3		27	17		
Tananarive Province	C	16	28	39	79		
	D	16	28	38	79		

Place		June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930
Senegal							
Baol [1]	C	-	62	79	48	53	
	D	2	48	20	23	35	4
Dakar [1]	C	53	140	108	3		
	D	117	122	90	8		
Louga [1]	C	60	138	75	61	37	10
	D	21	103	33	30	25	3
Thies [1]	C	52	54	24	12	24	27
	D	25	30	20	4	15	23
Tivaouane [1]	C	43	119	110	20	53	31
	D	28	70	54	14	31	25

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		June 29–July 26, 1930	July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930 4	11	18	25	November, 1930 1	8	15	22	29	December, 1930 6	13	20	27
Algeria:																		
Algiers	C	1	3															
Constantine	C	1									1							
Arabia: Aden	C	1																
Brazil:																		
Porto Alegre (alastrim)	C		1	1	12	7	7			14	14		20	8				
Rio de Janeiro	C										2							
British East Africa (see also table below)																		
Tanganyika	C	168	242	522	27	43	4	21	3	1		13						
	D	42	37	60	1		1	4	1									
British South Africa: Southern Rhodesia	C	31	1	1	14	39	98	2	2	54	1	38	12					
	D												2					
Canada:																		
Alberta	C	5	1	1		13	8	1					1					
British Columbia—Vancouver	C	6	6	2	1			1		3					1			
Manitoba	C			1														
Ontario	C	24	20	10	1		3	15		20	9		7	12	3			
North Bay	C																	1
Ottawa	C	13	7	5					14		9	14		8	1	1		
Toronto	C	1		1										2	2			
Quebec	C	3	5										1			1		
Montreal	C		7															
Saskatchewan	C	5	8	1		3				2			2		16			
China:																		
Changking	C	P	P	P	P	P	P	P	P	P	P	P	P					
Foochow	C	P	P	P		P				P		P						
Hong Kong	C	2																
	D	1																
Manchuria—																		
Harbin	C	2	2															
Kwantung—Dairen	C	8											2		1	1	1	
	D															1		
Nanking	C	P	P	P	P	P	P	P	P	P	P				P			

Shanghai—																		
Foreigners only	C	4	3	18				1	1		1				3	5		
Including natives	D			2								1				4	5	
Swatow	D	1	4	2	1			3	1	1		1	1					
Tientsin	C				1						1		1	1				
Chosen (see table below).																		
Colombia:																		
Barranquilla	C		2															
Buenaventura	C	10	2															
Cali	D					1		1							1			
Curacao (alastrim)	C	2	1															
Dutch East Indies:																		
Borneo	C	2																
Java—																		
Batavia and West Java	C	8	12	11	10	2	1	1	2	13	11		2		2			
	D	5	5	4	1	1	1	1	2	1	1		1					
East Java and Madura	C	1																
Sanggi Islands	C	11	36	14					29									
	D	3	2	3					3									
Egypt: Port Said	C	3																
France (see table below).																		
Great Britain:																		
England and Wales	C	529	344	341	82	74	44	125	86	87	92	107	116	160	95	137	138	
Ashton under Lyne	C	8																
Bradford	C	1				1	1	1	1	1					1			
Cardiff	C	2							1									
Leeds	C	1							1			2						
London	C	250	178	164	30	34	23	33	29	32	41	47	52	67	27	48	42	
London and Great Towns	C	408	285	268	55	56	32	80	52	58	68	82	88	136	74	112	111	
	D						1			1					1			
Stoke-on-Trent	C	9	2	2			1			1								
Scotland	C	1		5														
	D	1																
Honduras: Naco	C			5														
India	C	7,630	4,877	3,131	611	528	567	616	570	499	644							
	D	2,348	1,146	680	202	122	113	135	242	104	103							
Bombay	C	50	12	6			1								1			
	D	33	10	5											1			
Calcutta	C	73	25	14	3	4	3	2	2	4	3		3	5	6	4		
	D	56	21	9	3	4	3	1	2	2	3		3	2	4	2		
Cochin	C	6	14	3			8	4	3	5	10	7	4	5	6	7		
	D			1			1		1			2	2		2			
Karachi	C	1	4	4									2					
	D		3	2										1				
Madras	C	49	38	34	4	4	8	3	2	1	2	4	3	5	6	6		
	D	12	11	6	1	2	3	2			2				2	1		
Moulmein	C	18	2	1														
	D	1	1	1														
Negapatam	C	4	4	9	4	2	5	3	2	2	2	3	3		1	2		
Rangoon	C		3					2			1			1				
	D										1							
Tuticorin	C							1										
Vizagapatam	C						1											

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		June 29–July 26, 1930	July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27
India (French):																		
Chandernagor	C	4		3			3			3								
	D	3		2			1			1								
Karikal	C	2	9	5	1													
	D	2	9	2	1													
Pondicherry Province	C	26	22	35	11	10	6	11	2	2		7	7	5				
	D	25	22	33	11	8	6	11	2	2		7	7	5				
India (Portuguese)	C	1	9	4														
	D	1	2															
Indo-China (see also table below):																		
Pnompenh	C	1					2							1				
	D	1	1											1				
Saigon and Cholon	C		1	1						2			2	1		1		
	D		3	1						2			1			1		
Iraq:																		
Baghdad	C	3	1	1		2												
	D	1	1															
Mossoul Liwa	C	67			63		4	2			6		7	9				
	D	20			27								1	1				
Ivory Coast (see table below).																		
Mexico (see also table below):																		
Jalisco (State) Guadalajara	D	4	1			2		1	1		1	1	1		2			
Juarez	C		2															
	D		1		1				1									
Mexico City and surrounding territory	C	37	10	12	1	3	5	4	1	3	3	2	1	2		3		
	D	8	6	5			1	2	1		1					6		
Vera Cruz	C									1								
Morocco (see table below).																		
Nicaragua: Porto Cabezas	C																2	
Poland	C								2	3		3	1	2				
Portugal:																		
Lisbon	C	13	50	27	4	5		7	12			8	11		15	11	21	
Oporto	C		1															
Siam	C	6				1												
	D	3																

Somaliland, British: Boales	C					1					1				1			
	D					1												
Spain	C	5	2	5					14	5	11	21	23	21	23			
Straits Settlements	C	11	8	6	1	1	1	2	3	3	4		3	9	1	3	3	
	D	3	3	1			1			1	1		1	2		2	2	
Sudan (Anglo-Egyptian)	C	12	42	128	25	1	56		3			2		3		47		
	D	1	3	52	2		5					1				5		
Sudan (French) (see table below).																		
Switzerland: Berne Canton	C	1	2		1													
Syria (see table below).																		
Tunisia: Tunis	C	1			2													
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P		P			P	P	P	P	P	P	P					
Orange Free State	C	P	P							1	1	P	P					
Transvaal	C		P	P	P		P	P	P	P	P	P	P					
Upper Volta	C													6				
On vessel:																		
S. S. Manoa, from Honolulu to San Francisco	C	1																
S. S. Muncaster, at Manila from Hong Kong	C																	1

Place		June, 1930	July, 1930	August, 1930			September, 1930			October, 1930			November, 1930			Dec. 1-10, 1930
				1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30	
Indo-China (see also table above)	C	213	238	59	34		54	52	56	32	62	164		56		38
Ivory Coast	C											4		2		9
Sudan (French)	C	76	34			39		P			17					43
	D	18				3					2					16
Syria. Beirut	C	7	2	1												

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
British East Africa (see also table above):							
Kenya	C	171	142	186		424	
Uganda	C	78					
	D	69					
Chosen	C	107		3	2		
	D	35					
Seishin	C	2	1	2			
	D	1					

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
France	C	51		1			
Mexico Durango (see also table above)	D	4	3	3	3	2	
Morocco	C	18	5	3	8	4	4
Turkey	C	16					

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		June 29-July 26, 1930	July 27-Aug 23, 1930	Aug. 24-Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930 4	October, 1930 11	October, 1930 18	October, 1930 25	November, 1930 1	November, 1930 8	November, 1930 15	November, 1930 22	November, 1930 29	December, 1930 6	December, 1930 13	December, 1930 20	December, 1930 27
Algeria:																		
Algiers	C	6	2	3							1			2				
Constantine Department	C	2	3			2			1					1		1		
Oran	C	3	1	1			1	2						3		2		
Bulgaria	C	10	1	4	2		1	3			1	2	1	1	3	6		
	D	1																
China:																		
Manchuria—Harbin (see also table below)	C	2	2	2				1										
Shanghai	C		1															
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C	1	1	3	1							2	1	1				
	D			1								2						
Beheira Province	C	15		1													1	
	D	2															1	
Cairo	C		7	2												1	1	
Port Said	C		4	1		1			1	1								
Great Britain: Scotland—Dunfermline	C	1																
Greece (see table below).																		
Ireland:																		
Irish Free State—																		
Galway County—Oughterard	C	2																
Leitrim County—Mohill	C	1																
Mayo County—																		
Ballina	C	1																
Castlebar	C		1															
Westport	C	2	1															
Roscommon County—																		
Roscommon	C	1																
Strokestown	C	1																
Wicklow County—Shillelagh	C	2																
Latvia (see table below).																		
Lithuania (see table below).																		

Mexico:																		
Durango	D			1	1		1											
Mexico City, including municipalities in Federal District	C	5	9	7			3	5	1	1	5	4	1	1		12		
	D		2	2			2		1		5		2	3		2		
Morocco	C	11	8	2					1		1	1	1					
	D							1										
Palestine	C	6	3	3		1	1	1			2	1	1	6			1	1
Poland	C	36	34	23	3	6	6	7	7	8	15	7	12		21	9		
	D	4	3	1	1			1					1		3	3		
Portugal: Oporto	C		1			1		1		2	1	1	2	2	2			
Rumania	C	28	9	4	3	4	1	6	4	13	10	14	19					
	D	8	2								1	1	1					
Spain	C	3		1			1	1			4				1			
	D	1		1			1	1							1			
Tunisia	C	24	10	6	1	1	1	9					5		23			
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P						
Municipality of East London	C	1		2			1					1	1					
Natal	C	1	P	P		P	P	2	P	P	P							
Orange Free State	C	P	P	P														
Transvaal	C	P	P	P	P	P	P	P	P	P	P	P	P					
Yugoslavia (see table below).																		

Place		June, 1930	July, 1930	Aug. 1930	Sept., 1930	Oct., 1930	Nov., 1930
China: Harbin (see also table above)	C		14	5		3	
Chosen: Seoul	C	2	3	2	1		
Czechoslovakia	C	1		1			16
Greece: Athens	C	3	6	6	4	4	4
Latvia	C	3	3	1	2		

Place		June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930
Lithuania	C	16	18	7	24	1	5
	D			1	2		1
Turkey	C	2	7	2			3
Yugoslavia	C	6					

YELLOW FEVER

	Cases
Brazil	
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2

	Cases
Gold Coast:	
July 10, 1930	1
Albosso, Aug. 4, 1930 (death)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

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UNITED STATES TREASURY DEPARTMENT

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SPECIAL ARTICLES

Summary of Notifiable Diseases in States During 1929

Influenza Among Persons of Different Economic Status

The Essential Features of Sanitary Drinking Fountains

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of public health.

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PUBLIC HEALTH REPORTS

VOL. 46 — JANUARY 23, 1931 — NO. 4

SUMMARY OF NOTIFIABLE DISEASES IN STATES DURING 1929

The accompanying summary of the reported prevalence of communicable diseases in States during 1929 is taken from Supplement No. 88, which will soon be issued by the Public Health Service. The rates have been computed from data furnished by the health officers of the several States, the District of Columbia, and the insular possessions. The following list of diseases is included in the supplement:

Anthrax in man.
Chicken pox.
Cholera.
Dengue.
Diphtheria.
Gonorrhea.
Influenza.
Lethargic encephalitis.
Malaria.
Measles.
Meningococcus meningitis.
Mumps.
Pellagra.
Plague (human).
Pneumonia (all forms).
Poliomyelitis.
Rabies in animals.
Rabies in man.
Rocky Mountain spotted fever.
Scarlet fever.
Septic sore throat.
Smallpox.
Syphilis.
Tuberculosis (all forms and respiratory system).
Tularaemia
Typhoid fever.
Typhus fever.
Undulant fever.
Whooping cough.
Yellow fever.

The following table shows the States (including the District of Columbia and insular possessions) for which morbidity and mortality data were received:

Morbidity	Mortality	Morbidity	Mortality
Alabama	Alabama.	Nevada	Nevada.
Arizona	Arizona.	New Hampshire	New Hampshire.
Arkansas	Arkansas.	New Jersey	New Jersey
California	California.	New Mexico	New Mexico
Colorado	Colorado.	New York	New York.
Connecticut	Connecticut.	North Carolina	North Carolina.
Delaware	Delaware	North Dakota	North Dakota.
District of Columbia	District of Columbia.	Ohio	Ohio
Florida	Florida.	Oklahoma	Oklahoma.
Georgia	Georgia	Oregon	Oregon
Idaho	Idaho.	Pennsylvania	Pennsylvania
Illinois	Illinois	Rhode Island	Rhode Island.
Indiana	Indiana.	South Carolina	South Carolina.
Iowa	Iowa.	South Dakota	South Dakota.
Kansas	Kansas	Tennessee	Tennessee.
Kentucky	Kentucky.	Texas	Texas.
Louisiana	Louisiana.	Utah	Utah.
Maine	Maine.	Vermont	Vermont.
Maryland	Maryland.	Virginia	Virginia.
Massachusetts	Massachusetts.	Washington	Washington.
Michigan	Michigan.	West Virginia	West Virginia.
Minnesota	Minnesota.	Wisconsin	Wisconsin.
Mississippi	Mississippi.	Wyoming	Wyoming.
Missouri	Missouri.	Hawaii Territory	Hawaii Territory.
Montana	Montana.	Philippine Islands	Philippine Islands.
Nebraska	Nebraska.		Porto Rico.

The populations used in computing case and death rates were estimated as of July 1, 1929, based on the 1920 populations and the preliminary figures for the 1930 census. Final figures for the 1930 census will make some difference in the rates for a few States.

For most of the diseases the compilation contains four tables: (1) Estimated expectancy, (2) morbidity, (3) mortality, (4) rates. The estimated expectancy given in the tables for some of the diseases represents an attempt to ascertain from the experience of recent years how many cases of the disease under consideration might be expected in 1929.

In comparing the figures for 1929 with the estimated expectancy, or with reports for preceding years, it should be borne in mind that there has been a gradual improvement in the reporting of communicable diseases during the last few years. An increase in the number of cases reported may be due to better reporting of the particular disease rather than to an increase in the number of cases occurring.

In some instances comparatively large numbers of cases of diseases reported in certain States may be due to the system of reporting rather than to unusual prevalence of the diseases. For instance, in Mississippi physicians report some diseases monthly to the State health officer, giving the number of cases occurring in their practice during the month. This method of reporting probably is responsible, in part, at least, for the comparatively large numbers of cases of certain diseases reported in Mississippi.

Tabulations of reported cases and deaths from communicable diseases, similar to the tables here presented, have been issued by the United States Public Health Service for the years 1912 to 1928, inclusive (Reprints numbered 163, 208, 298, 345, 426, 505, 551, 643, 681, 791, 879, 974, 1056, 1132, and Supplements Nos. 67, 73, and 79, respectively).

As long as the supply lasts, copies of Supplement No. 88 may be had free on request by subscribers of Public Health Reports and others desiring them. Address the Surgeon General, United States Public Health Service, Washington, D. C.

Summary of Notifiable Diseases in States, 1929

CHICKEN POX

48 States:[1]

Cases reported, 1929 (population 121,455,000)	216, 635
Estimated expectancy, based on years 1922–1928	180, 359
Cases per 1,000 inhabitants, 1929	1. 784
Cases per 1,000 inhabitants, estimated expectancy	1. 571

[1] The District of Columbia is also included.

46 States: [1]	
Deaths registered, 1929 (population 116,840,000)	**147**
Deaths per 1,000 inhabitants, 1929	**0. 001**
Cases reported for each death registered, 1929	**1, 416**

DIPHTHERIA

48 States: [1]	
Cases reported, 1929 (population 121,455,000)	85, 365
Estimated expectancy, based on years 1922–1928	108, 176
Cases per 1,000 inhabitants, 1929	0. 703
Cases per 1,000 inhabitants, estimated expectancy	0. 942
Deaths registered, 1929	7, 937
Deaths per 1,000 inhabitants, 1929	0. 065
Cases reported for each death registered, 1929	11

GONORRHEA

39 States: [1]	
Cases reported, 1929 (population 112,106,000)	148, 132
Cases per 1,000 inhabitants, 1929	1. 321

INFLUENZA

40 States: [1]	
Cases reported, 1929 (population 89,210,000)	682, 928
Cases per 1,000 inhabitants, 1929	7. 655
Deaths registered, 1929	51, 499
Deaths per 1,000 inhabitants, 1929	0. 577
Cases reported for each death registered, 1929	13
48 States: [1]	
Deaths registered, 1929 (population 121,455,000)	66, 247
Deaths per 1,000 inhabitants, 1929	0. 545

LETHARGIC ENCEPHALITIS

44 States: [1]	
Deaths registered, 1929 (population, 115,784,000)	1, 359
Deaths per 1,000 inhabitants, 1929	0. 012

MALARIA

33 States:	
Cases reported, 1929 (population, 100,853,000)	164, 030
Cases per 1,000 inhabitants, 1929	1. 626
Deaths registered, 1929	4, 036
Deaths per 1,000 inhabitants, 1929	0 040
Cases reported for each death registered, 1929	41
38 States: [1]	
Deaths registered, 1929 (population, 114,447,000)	4. 146
Deaths per 1,000 inhabitants, 1929	0 036

MEASLES

48 States: [1]	
Cases reported, 1929 (population, 121,455,000)	366, 056
Estimated expectancy, based on years 1922–1928	362, 997
Cases per 1,000 inhabitants, 1929	3. 014
Cases per 1,000 inhabitants, estimated expectancy	3. 161

[1] The District of Columbia is also included.

48 States[1]—Continued.

Deaths registered, 1929	2, 919
Deaths per 1,000 inhabitants, 1929	0. 024
Cases reported for each death registered, 1929	125

MENINGOCOCCUS MENINGITIS

46 States:[1]	
Cases reported, 1929 (population, 120,633,000)	10, 551
Estimated expectancy, based on years 1922–1928	2, 432
Cases per 1,000 inhabitants, 1929	0. 087
Cases per 1,000 inhabitants, estimated expectancy	0. 021
45 States:[1]	
Deaths registered, 1929 (population, 115,865,000)	4, 787
Deaths per 1,000 inhabitants, 1929	0. 041
44 States:[1]	
Deaths registered, 1929 (population, 115,401,000)	4, 785
Deaths per 1,000 inhabitants, 1929	0. 041
Cases reported for each death registered, 1929	2

MUMPS

43 States:	
Cases reported, 1929 (population, 107,208,000)	103, 269
Estimated expectancy, based on years 1922–1928	84, 800
Cases per 1,000 inhabitants, 1929	0. 963
Cases per 1,000 inhabitants, estimated expectancy	0. 836
46 States:[1]	
Deaths registered, 1929 (population, 116,840,000)	104
Deaths per 1,000 inhabitants, 1929	0. 001
41 States:	
Deaths registered, 1929 (population, 102,593,000)	93
Deaths per 1,000 inhabitants, 1929	0. 001
Cases reported for each death registered, 1929	1, 073

PELLAGRA

13 States:[1]	
Cases reported, 1929 (population 25,841,000)	25, 423
Cases per 1,000 inhabitants, 1929	0. 984
41 States:[1]	
Deaths registered, 1929 (population 114,917,000)	7, 386
Deaths per 1,000 inhabitants, 1929	0. 064

PNEUMONIA (ALL FORMS)

46 States:[1]	
Deaths registered, 1929 (population 113,626,000)	107, 274
Deaths per 1,000 inhabitants, 1929	0. 944

POLIOMYELITIS (INFANTILE PARALYSIS)

41 States:[1]	
Cases reported, 1929 (population 105,716,000)	2, 837
Estimated expectancy, based on years 1922–1928	3, 394
Cases per 1,000 inhabitants, 1929	0. 027
Cases per 1,000 inhabitants, estimated expectancy	0. 034

[1] The District of Columbia is also included.

41 States[1]—Continued.

Deaths registered, 1929	**706**
Deaths per 1,000 inhabitants, 1929	**0. 007**
Cases reported for each death registered, 1929	**4**

48 States:[1]

Deaths registered, 1929 (population 121,455,000)	**843**
Deaths per 1,000 inhabitants, 1929	**0. 007**

SCARLET FEVER

48 States:[1]

Cases reported, 1929 (population 121,455,000)	182, 634
Estimated expectancy, based on years 1922-1928	175, 154
Cases per 1,000 inhabitants, 1929	1. 504
Cases per 1,000 inhabitants, estimated expectancy	1. 525
Deaths registered, 1929	2, 497
Deaths per 1,000 inhabitants, 1929	0. 021
Cases reported for each death registered, 1929	73

SEPTIC SORE THROAT

30 States:

Cases reported, 1929 (population 65,312,000)	3, 267
Cases per 1,000 inhabitants, 1929	0. 050

38 States:[1]

Deaths registered, 1929 (population 89,839,000)	1, 569
Deaths per 1,000 inhabitants, 1929	0. 017

SMALLPOX

48 States:[1]

Cases reported, 1929 (population 121,455,000)	42, 282
Estimated expectancy, based on years 1922-1928	31, 096
Cases per 1,000 inhabitants, 1929	0. 348
Cases per 1,000 inhabitants, estimated expectancy	0. 271
Deaths registered, 1929	145
Deaths per 1,000 inhabitants, 1929	0. 001
Cases reported for each death registered, 1929	292

SYPHILIS

39 States:[1]

Cases reported, 1929 (population 112,106,000)	196, 932
Cases per 1,000 inhabitants, 1929	1. 757

TUBERCULOSIS (ALL FORMS)

48 States:[1]

Deaths registered, 1929 (population 121,455,000)	90, 470
Deaths per 1,000 inhabitants, 1929	0. 745

TUBERCULOSIS (RESPIRATORY SYSTEM)

45 States:[1]

Deaths registered, 1929 (poulation 114,641,000)	77, 011
Deaths per 1,000 inhabitants, 1929	0. 672

[1] The District of Columbia is also included.

TYPHOID FEVER

48 States: [1]	
Cases reported, 1929 (population 121,455,000)	23, 289
Estimated expectancy, based on years 1922–1928	34, 417
Cases per 1,000 inhabitants, 1929	0. 192
Cases per 1,000 inhabitants, estimated expectancy	0. 300
Deaths registered, 1929	5, 232
Deaths per 1,000 inhabitants, 1929	0. 043
Cases reported for each death registered, 1929	4

WHOOPING COUGH

48 States: [1]	
Cases reported, 1929 (population 121,455,000)	197, 371
Estimated expectancy, based on years 1922–1928	153, 862
Cases per 1,000 inhabitants, 1929	1. 625
Cases per 1,000 inhabitants, estimated expectancy	1. 340
Deaths registered, 1929	6, 956
Deaths per 1,000 inhabitants, 1929	0. 057
Cases reported for each death registered, 1929	28

THE INCIDENCE OF INFLUENZA AMONG PERSONS OF DIFFERENT ECONOMIC STATUS DURING THE EPIDEMIC OF 1918 [2]

By Edgar Sydenstricker, *Statistician, United States Public Health Service*

Perhaps no observation during the great influenza epidemic of 1918–1919 was more common than the familiar comment that "the flu hit the rich and the poor alike." Apparently there was ample ground for a belief in the impartiality of the disease. Its widespread prevalence throughout the country, the frequency with which households in every social class were attacked, and the fact that prominent persons in every community were struck down, were among the outstanding, undeniable experiences in the epidemic. A certain consolation seemed to be afforded by the thought that the pestilence was democratic, even in so dreadful a sense, in its behavior.

Like many conclusions based on general impressions, this observation was true only in part. Epidemic influenza undoubtedly was very prevalent among all classes of persons and its mortality toll

[1] The District of Columbia is also included.

[2] From the office of statistical investigations, United States Public Health Service. Acknowledgment is made to Miss Mary H Louden, under whose immediate supervision the tabulations presented in this paper were made

The data used in this paper were collected by special surveys of influenza in a number of localities by the United States Public Health Service under the general direction of Surg. W. H. Frost and the writer. Partial presentation of the results of these surveys have already been made in the Public Health Reports, as follows

Influenza in Maryland Preliminary Statistics for Certain Localities, by W. H. Frost and Edgar Sydenstricker. Public Health Reports, vol. 34, No. 11, Mar. 14, 1919.

The Epidemiology of Influenza, by W. H. Frost. Journal Am Med. Association, vol. 73, No. 5, Aug. 2, 1919. Reprinted in Public Health Reports, vol. 34, No. 33, Aug. 15, 1919.

Statistics of Influenza Morbidity, with special reference to certain factors in case incidence and case fatality, by W. H. Frost. Public Health Reports, vol. 35, No. 11, Mar. 12, 1920.

was levied from the wealthy as well as from the poor. But when the generalization was subjected to the closer analysis afforded by actual records of influenza incidence in 1918 in enumerated populations, the interesting indication appeared that there were marked and consistent differences in its incidence—with respect both to morbidity and to mortality—among persons of different economic status. An association between the incidence of epidemic influenza and economic condition was manifested. Apparently the lower the economic level the higher was the attack rate. This relationship was found to persist even after allowance had been made for the influence of the factors of color, sex, and age, and certain other conditions.

CHARACTER OF THE DATA

The scope and method of the special influenza surveys by the Public Health Service have been discussed in previous publications, but so far as they relate to the particular series of data presented here, a brief explanation may be made.

The surveys were made in 10 cities ranging in population from 20,000 to 500,000 and in several smaller cities and rural areas in Maryland. The data here presented are only for nine urban localities with a population of 25,000 and over, and relate to slightly over 100,000 individuals. The information was collected by intelligent enumerators working under careful supervision and with detailed instructions. In each locality a house-to-house canvass was made of not less than 10 areas which were selected in such a way as to include fairly representative samples of different parts of the locality as well as of different classes of the population. The size of the sample populations canvassed in each locality is shown in the detailed tables presented in this report.

Regarding each individual in the population canvassed the enumerators recorded the name, color, sex, and age at last birthday; and whether sick or not sick since September 1, 1918, from influenza, pneumonia, or indefinitely diagnosed illness suspected to be influenza.

Regarding each case of sickness, the facts recorded were the nature of the illness (i. e., whether influenza, pneumonia, or "doubtful"), date of onset, duration, and date of death, if death occurred. The statement of the informant as to the occurrence of sickness was accepted, although the informant was questioned as to what diagnosis the attending physician had made, if a physician was in attendance. While three "types" of sickness were recorded, namely "influenza," "pneumonia," and "doubtful," various analyses of the data strongly suggest that cases recorded as any of the three types properly can be considered, for practical purposes, as epidemic influenza. For example, the chronological curve of "doubtful" cases was very similar to the curves for "influenza" and "pneumonia."

Regarding each household, the enumerators recorded the number of rooms occupied by the household and the economic status of the family. The actual economic classification was made by the enumerators themselves. Each enumerator was instructed to record at the time of her visit to the household her impression of its economic condition in one of four categories—"well-to-do," "moderate," "poor," "very poor." The enumerators were local persons of average intelligence and education. They were purposely given no standards for comparison or more detailed instructions on this point, the intention being to have them record their own impressions naturally and according to their own standards. It was believed also that if not less than four possible categories were allowed them in which to place the families visited, the families classified in the two extremes would permit sufficient contrast.

The results appear to justify the soundness of these assumptions. The distribution of the populations in the various economic classes suggested by the terms employed, the differences in distribution according to age of persons within each economic class, the distinct and fairly regular differences in influenza incidence among the several classes, as well as other internal evidences, suggest that although the method was crude, a classification was made that was sufficiently accurate for finding out whether or not a differential incidence did occur.

INFLUENZA INCIDENCE AMONG PERSONS OF DIFFERENT ECONOMIC STATUS

Morbidity.—A somewhat detailed tabulation showing the number of persons, the number of cases, and the rates in each economic class, subdivided according to broad age groupings, is given in Table I.

TABLE I.—*Incidence of epidemic influenza in 1918 among white persons of different ages classified according to the general economic condition of the households surveyed in nine localities*

Age group	Rate per 1,000				Number of persons canvassed				Number of influenza cases			
	Well-to-do	Moderate	Poor	Very poor	Well-to-do	Moderate	Poor	Very poor	Well-to-do	Moderate	Poor	Very poor
	All localities											
All ages	232	264	330	372	9, 550	55, 784	25, 356	3, 988	2, 211	14, 751	8, 376	1, 486
Under 15 years	308	330	374	408	2, 129	14, 862	9, 291	1, 695	656	4, 910	3, 474	692
15-24	297	297	335	374	1, 494	9, 704	4, 412	672	443	2, 878	1, 480	251
25-44	248	277	347	370	3, 244	19, 153	7, 388	1, 060	804	5, 303	2, 565	392
45 and over	115	138	201	269	2, 683	12, 065	4, 265	561	308	1, 660	857	151
	New London, Conn.											
All ages	170	164	230	257	271	4, 727	2, 442	175	46	776	562	45
Under 15 years	229	186	228	211	48	1, 033	975	95	11	196	222	20
15-24	167	183	220	250	30	875	400	20	5	160	88	5
25-44	239	185	270	370	92	1, 576	725	46	22	291	196	17
45 and over	79	105	164	214	101	1, 223	342	14	8	129	56	3

TABLE I.—*Incidence of epidemic influenza in 1918 among white persons of different ages classified according to the general economic condition of the households surveyed in nine localities*—Continued

Age group	Rate per 1,000				Number of persons canvassed				Number of influenza cases			
	Well-to-do	Moderate	Poor	Very poor	Well-to-do	Moderate	Poor	Very poor	Well-to-do	Moderate	Poor	Very poor
	Baltimore, Md.											
All ages	187	252	312	379	2,786	14,585	8,612	1,400	520	3,670	2,685	530
Under 15 years	285	323	364	422	509	3,765	3,003	602	145	1,215	1,093	254
15-24	261	300	318	347	417	2,525	1,594	239	109	757	506	83
25-44	195	265	332	339	912	4,823	2,456	342	178	1,278	816	133
45 and over	93	121	173	276	948	3,469	1,559	217	88	420	270	60
	Augusta, Ga.											
All ages	335	404	524	343	358	633	1,203	35	120	256	630	12
Under 15 years	432	476	623	273	118	185	390	11	51	88	243	3
15-24	257	436	504	500	70	110	230	4	18	48	116	2
25-44	374	429	505	445	91	212	327	9	34	91	165	4
45 and over	215	230	414	273	79	126	256	11	17	29	106	3
	Macon, Ga.											
All ages	222	195	270	301	1,023	2,998	1,142	614	229	584	309	185
Under 15 years	311	263	316	303	264	699	395	221	82	184	125	67
15-24	250	192	266	310	148	667	244	126	37	128	65	39
25-44	234	202	266	307	384	1,046	319	176	90	211	85	54
45 and over	88	104	185	275	227	586	184	91	20	61	34	25
	Des Moines, Iowa											
All ages	204	238	262	279	505	3,801	907	165	103	904	238	46
Under 15 years	294	312	270	352	102	1,091	356	54	30	340	96	19
15-24	257	217	326	242	70	632	135	33	18	137	44	8
25-44	252	252	262	245	155	1,227	244	49	39	309	64	12
45 and over	90	139	198	241	178	851	172	29	16	118	34	7
	Louisville, Ky.											
All ages	81	157	217	380	726	6,519	2,106	376	59	1,026	456	143
Under 15 years	128	236	272	422	148	1,738	817	187	19	411	222	79
15-24	97	158	193	450	113	1,085	353	60	11	171	68	27
25-44	94	148	223	313	223	2,162	583	83	21	320	130	26
45 and over	33	81	102	239	242	1,534	353	46	8	124	36	11
	Little Rock, Ark.											
All ages	291	356	435	427	574	4,939	1,254	89	167	1,756	545	38
Under 15 years	419	421	508	500	117	1,460	488	42	49	615	248	21
15-24	310	368	465	286	100	832	200	14	31	306	93	4
25-44	295	360	419	458	224	1,873	403	24	66	674	169	11
45 and over	158	208	215	222	133	774	163	9	21	161	35	2
	San Antonio, Tex											
All ages	500	532	571	605	1,217	6,677	3,160	466	609	3,553	1,805	282
Under 15 years	511	575	614	655	311	2,042	1,248	200	159	1,175	766	131
15-24	623	602	593	687	257	1,283	550	83	160	772	326	57
25-44	516	557	581	548	397	2,240	937	126	205	1,247	544	69
45 and over	337	323	398	439	252	1,112	425	57	85	359	169	25
	San Francisco, Calif.											
All ages	171	204	253	307	2,090	10,905	4,530	668	358	2,225	1,146	205
Under 15 years	215	242	284	346	512	2,829	1,619	283	110	686	459	98
15-24	187	236	246	280	289	1,692	706	93	54	399	174	26
25-44	195	221	284	322	766	3,994	1,394	205	149	882	395	66
45 and over	86	108	144	172	523	2,390	811	87	45	259	117	15

Since the morbidity rate from influenza varies among persons of different sexes and ages, and since the distribution of persons according to sex and age varies in the different economic classes, it is necessary to make allowance for the influence of these factors in compar-

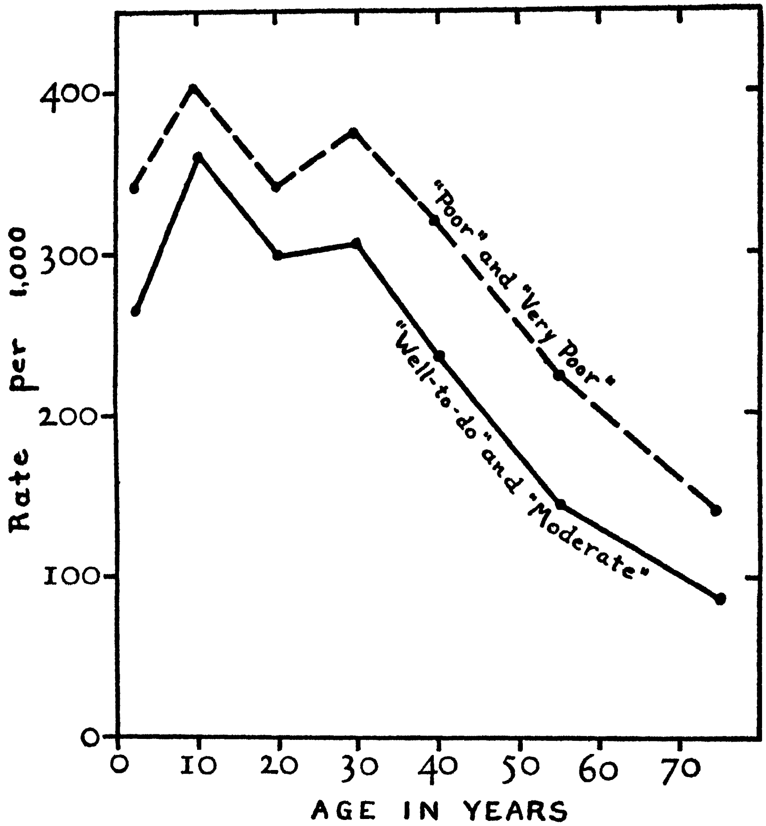

FIGURE 1.—Age incidence of influenza in the epidemic of 1918 among persons of different economic status

ing the morbidity rates for the several economic classes. The factor of sex was found in trial tabulations to be so inconsiderable that adjustments for sex were regarded as an unnecessary refinement. The factor of age, however, was more important.[1] Therefore in the table

[1] In the following tabulation is shown the distribution of persons in each economic class according to broad age groups.

TABLE IIA.—*Distribution of the white population included in special surveys of the 1918 influenza epidemic according to age for each of the general economic classes*

Economic status of household	All ages	Percentage in specified age groups			
		Under 15 years	15-24 years	25-44 years	45 years and over
All classes	100.0	29.6	17.2	32 6	20.7
Well-to-do	100.0	22.3	15.7	34.0	28.1
Moderate	100.0	26.6	17.4	34.3	21.6
Poor	100.0	36.6	17.4	29.1	16.8
Very poor	100.0	42.5	16.9	26.6	14.1

It will be noted that the proportion of the population in the younger age groups regularly increases as we descend in the economic scale, and vice versa. The differences in morbidity rates among persons of different ages in the several economic classes is discussed later.

presented below the rates for the various economic classes were adjusted to a standard age distribution, that of the continental United States in 1910 being used.

TABLE II.—*1918 influenza morbidity rate (adjusted for age)* [1] *per 1,000 white persons of different economic status in nine localities in which special surveys were made*

Locality	Economic status of household			
	Well-to-do	Moderate	Poor	Very poor
All localities	252	272	326	364
New London	192	170	227	266
Baltimore	218	263	309	370
Augusta	339	408	526	(2)
Macon	234	201	267	300
Des Moines	236	243	265	278
Louisville	94	166	210	361
Little Rock	312	352	418	(2)
San Antonio	502	527	559	589
San Francisco	179	209	250	293

[1] The "standard population" used was the total population of the United States in 1910.
[2] Insufficient data.

While the number of persons classified as "very poor" and as "well-to-do"—the two extremes of the economic scale—are relatively small, the relationship between economic status and influenza incidence is fairly regular, not only for the nine localities taken together, but for each of the localities. The ratio of the rate for the "very poor" to that for the "well-to-do" is 1.3 to 1.0 for the nine localities as a group, but it varies considerably in the different localities. The nature of the data did not permit of analyses in sufficient detail to suggest the reasons for this variation.

Mortality.—The same relation is shown when the mortality rates from influenza and pneumonia (all forms) are compared for persons in the different economic classes. After making allowance for differences in the age distribution, it was found that the death rate was the same in the two highest classes, was over 33 per cent greater in the class denoted as "poor," and was nearly three times as high among persons classified as "very poor." The rates are shown in the following table:

TABLE III.—*Mortality from influenza and pneumonia during the epidemic of 1918 among white persons included in surveys made in nine localities classified according to the general economic condition of the household*

Economic status of household	Rate per 1,000 persons (adjusted for age) [1]
Well-to-do	3.8
Moderate	3.8
Poor	5.2
Very poor	10.0

[1] The "standard population" used was the total population of the United States in 1910.

That the higher mortality in the economically less favored classes was not due entirely to a higher incidence, but that the fatality of cases among "poor" and "very poor" persons was higher than among the "well-to-do" and those in "moderate" circumstances was clearly shown when the case fatality rate, after making allowances for differ-

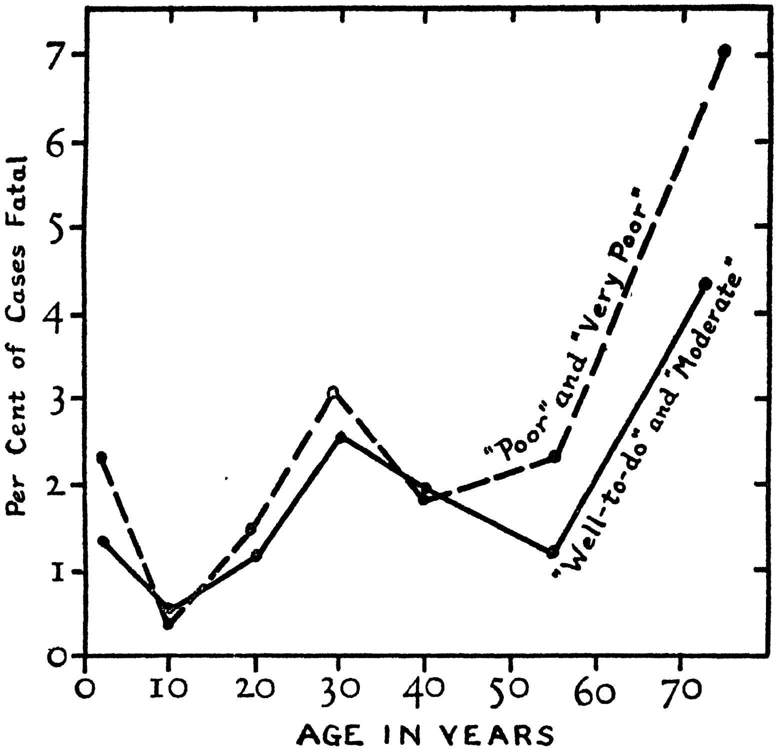

FIGURE 2.—Fatality of cases of influenza in the epidemic of 1918 according to age among persons of different economic status

ences in age distribution, was computed for each economic class. This is exhibited in the following table:

TABLE IV.—*Case fatality of influenza in the epidemic of 1918 among white persons included in surveys made in nine localities classified according to the general economic condition of the household*

Economic status of household	Rate per 100 cases (adjusted for age)[1]
Well-to-do	1.5
Moderate	1.5
Poor	1.7
Very poor	2.8

[1] The "standard population" used was the total population of the United States in 1910.

It will be noted that the case fatality rate was nearly twice as great among the "very poor" as among the "well-to-do" and those classified as in "moderate" circumstances.

THE EFFECTS OF CERTAIN SPECIFIC CONDITIONS

What specific conditions included under the term "economic status" were responsible for these differences in influenza incidence? The discovery of an association of relatively high influenza incidence with poor economic condition does not, by any means, invest poor economic condition with causal significance. It points to the probability that the incidence of the disease is influenced by one or more of the many factors that are themselves bound up, causally or otherwise, with the economic status of a population. Whether or not an inheritance of feeble resistance to influenza or to secondary complicating infections goes with incapacity to earn a good living; what effects upon resistance to the disease a continued unfavorable environment may have; what increase in the chance for infection is brought about by the conditions under which members of the poorer households work and live; what differences in the medical and other care of patients in the poorer and richer households may have prevailed and the effect of such differences upon the fatality of the disease—these are only some of the questions which the existence of a statistical correlation does not specifically answer. The correlation merely suggests that some of these conditions may have a bearing on the question.

The specific conditions that may be involved probably are not only numerous but are so intertwined that even a very intensive investigation of a very much larger exposure could give only partial and incomplete answers to the epidemiological questions that present themselves. The present study, therefore, can not be considered as carrying our inquiry much further than the rough determinations presented above. On one or two points, however, some rather definite evidence is given, and suggestive evidence is afforded on other points.

1. A comparison of the proportion of households in which at least one case of influenza occurred, for the different economic classes, shows that the *introduction* of the disease tended to be relatively more frequent in the poorer than in the richer households.

In making this comparison, obviously it is necessary to make allowance for the possible influence of (*a*) differences among the various economic classes in the sex and age composition of members of the households, and (*b*) differences among the various economic classes in the size of the households. It was found that differences in sex and age of members of the household affected the morbidity rates only slightly while differences in the size of the households appreciably affected the result in some instances. Accordingly, for each locality the percentages of households attacked were weighted according to a standard size distribution of households. The resulting attack rates per 100 households are shown in Table V.

TABLE V.—*Proportion of total households in which one or more persons were attacked by influenza during the epidemic of 1918 in selected areas in nine localities in which special surveys were made*

Locality	Per cent of total households affected with influenza for each economic class [1]			
	Well-to-do	Moderate	Poor	Very poor
New London	43	37	41	59
Baltimore	42	48	54	61
Augusta	46	63	70	72
Macon	41	39	42	56
Des Moines	52	46	47	43
Louisville	21	30	39	51
Little Rock	50	57	59	77
San Antonio	96	99	95	94
San Francisco	36	41	44	46

[1] Adjusted to a standard distribution of households according to size. Adjustment for sex and age indicated that differences in sex and age composition of households did not affect the rates materially.

Although the rates do not always vary greatly and some of the groups do not comprise large populations, the indication is fairly consistent in seven of the nine localities.[1] Obviously, if an association existed between the incidence of influenza and economic status, some effect of this association in the selection of households by the disease might be expected, other things being equal. But to what extent this selection was due to greater opportunity for infection, or reflects less resistance to infection on the part of persons composing the poorer households, or is the result of other factors, are also questions that can not be answered definitely by our data.

2. On the other hand, a much more marked correlation is evident between economic status and influenza incidence in households after the disease had been introduced, as the following table shows:

TABLE VI.—*Influenza attack rate during the 1918 epidemic in white households of different economic status [1] in Baltimore*

Economic status	Attack rate per 1,000 persons in households in which one or more cases occurred
All classes	475
Well-to-do	390
Moderate	455
Poor	506
Very poor	577

[1] The rates for the different economic classes have been adjusted to a standard age distribution, the "standard population" used being the total population of the United States in 1910.

Here it is seen that in affected households, comparable from the points of view of size and sex and age composition, the influenza attack rate manifests an association with economic status similar

[1] One of the two localities for which this indication does not appear was San Antonio, in which practically all (98 per cent) of the households were attacked. The other was Des Moines; I am unable to suggest any explanation from the data for this exception.

to that already shown by the influenza morbidity rate among persons constituting the entire population of each economic class. The ratio of the attack rates in affected households to the total morbidity rates in the various economic classes manifests no great nor consistent differences, the ratios being as follows: "Well-to-do," 1.55:1; "moderate," 1.67:1; "poor," 1.55:1; "very poor," 1.56:1.

From the two foregoing indications yielded by these data the observation may be made that economic status, or, more precisely, some condition or conditions of which economic status is an index, was a relatively unimportant determinant of the extent to which the disease spread in a community but was of considerable importance as a determinant of the morbidity rate within the households attacked, and thus presumably among persons definitely exposed to an active case of the disease at all of its stages. That factors other than those associated with economic status were far more powerful in the spread of the epidemic within the community is clearly evident from the wide variation in the proportions of households attacked as well as in the morbidity rates in the nine localities surveyed, as the following table shows:

TABLE VII.—*A comparison of the proportion of households attacked by influenza and the influenza morbidity rate per 1,000 persons for nine localities in which special surveys of 1918 were made*

Locality	Per cent of households attacked [1]	Morbidity rate per 1,000 persons [2]
New London	39	185
Baltimore	50	246
Augusta	63	341
Macon	42	213
Des Moines	46	231
Louisville	32	150
Little Rock	57	359
San Antonio	98	535
San Francisco	41	215

[1] Weighted for size of household
[2] Adjusted to age distribution of the population in the United States in 1910

In fact, there is a very close correlation between the percentages of households attacked and the morbidity rates,[1] and this correlation persists for each economic class. (Tables II and V.) On the other hand, the attack rates in affected households did not vary greatly in the nine localities. Thus in San Antonio where 98 per cent of the households were affected, the attack rate within these households was 548 per 1,000 persons, whereas in Baltimore, where only 50 per cent of the households were affected, the attack rate within these households was 475 per 1,000.

[1] Although only nine observations are available, their values when plotted in a correlation diagram fall practically on a straight line, and, considering the number, are well distributed (r=0 79±0 05).

These indications naturally lead us to such consideration of possible intra-household factors as the data may afford.

3. The only information bearing upon intra-household factors that was obtained related to "crowding." The data on this point were the number of persons and the number of rooms occupied in each household. The individuals thus could be classified according to the number of persons per room. Obviously, "crowding," as expressed by "persons per room," is a very crude index of the opportunity for contact among persons living in households, but upon the assumption that such contact generally would be more close and frequent in crowded households than in households where, say, there were two rooms per person, it was thought worth while to compute the influenza morbidity rate for different groups living under different degrees of crowding. These rates are given in Table VIII, adjusted to a standard age distribution.

TABLE VIII.—*1918 influenza morbidity rate per 1,000 white persons classified according to degree of household "crowding" in nine localities* [1]

Locality	Number of persons per room		
	1 or less	More than 1 but not over 2	More than 2
All localities	265	328	405
New London	175	219	304
Baltimore	267	323	242
Augusta	386	504	(2)
Macon	202	249	323
Des Moines	240	251	(2)
Louisville	284	202	280
Little Rock	318	412	408
San Antonio	522	545	619
San Francisco	199	200	257

[1] The rates for the different classes have been adjusted to a single age distribution, the "standard population" used being the total population of the United States in 1910.
[2] Insufficient data.

Taking the nine localities together, a quite definite association of household congestion and influenza is suggested. This, however, might be nothing more than a reflection of economic status. In fact, the actual distribution of the individuals in each economic class according to "persons per room" shows quite clearly that a much larger proportion of individuals were members of relatively congested households in the poorer classes than in the classes denoted as "well-to-do" and as in "moderate" circumstances. The differences in distribution are shown in the following table:

TABLE IX.—*Relation of over-crowding to economic status in white households included in special influenza surveys of 1918 in four localities*

Economic status of household	Total number of persons in the households visited	Number of persons per room: One or less	Number of persons per room: More than 1 but not over 2	Number of persons per room: More than 2
	Number of persons			
Well to do	6,575	6,115	446	14
Moderate	36,764	27,789	8,732	243
Poor	17,398	9,240	7,273	880
Very poor	2,583	860	1,377	346
	Per cent of total number of persons			
Well to do	100.0	93.0	6.8	0.2
Moderate	100.0	75.6	23.7	.7
Poor	100.0	53.1	41.8	5.1
Very poor	100.0	33.3	53.3	13.4

A more detailed analysis of the data, therefore, was necessary in which the influenza morbidity rate among persons living in households of different degrees of household "congestion" could be compared for each economic class; or, to state it in another way, the influenza morbidity rate among persons in different economic classes could be compared for various degrees of household "congestion." In such an analysis economic status thus would be used as an index of all environmental and other conditions in order to single out with greater distinctness the influence of one of these conditions, namely, household congestion. Obviously those households in which no cases occurred have no bearing on the question of intrahousehold incidence and should be excluded. It was not practicable to tabulate the entire mass of data in such detail, but the experience of San Antonio, where an extensive survey was made and where 98 per cent of the households had one or more cases, conformed to the requirements of the desired analysis.

TABLE X.—*1918 influenza morbidity rate among white persons surveyed in San Antonio and classified according to degree of household crowding and economic status*

Economic status of household	Attack rate per 1,000 in household with number of persons per room as follows:[1] One or less	More than 1 but not more than 2	More than 2
Well to do	504	514	(2)
Moderate	525	533	570
Poor	502	561	650
Very poor	542	619	603

[1] Adjusted to the age distribution of the population of the United States in 1910 and excluding persons in households that were not affected by influenza in the epidemic of 1918.
[2] Insufficient data.

The San Antonio data afford no clear-cut evidence that the mere fact of household crowding, as measured by the ratio "persons per room," was associated with the incidence of influenza. This indication is at variance with W. Vaughn's (1) observation in Boston that crowded families were more apt to have multiple cases of influenza in the 1918 epidemic, but "crowding" in Boston might be a quite different thing from "crowding" in San Antonio. On the other hand, it is in accordance with the findings of various British investigators (2). Although some doubt may be entertained as to the efficiency of household congestion as an index of the degree of effective contact between a case and susceptible persons, which is the datum desired, it seems to be clear that the association between influenza incidence and economic status persists within each "persons per room" class. This suggests the conclusion that household congestion, although a concomitant of poverty, is not per se the determining factor in establishing the association of economic status and influenza in 1918.

INFLUENZA INCIDENCE AMONG PERSONS OF DIFFERENT ECONOMIC STATUS AND AGE

Morbidity.—A comparison of the influenza morbidity and of case fatality rates at different ages among persons of different economic status throws some light on the relative importance of some of the various conditions included under the term "economic status" as factors in determining incidence and lethal rates. It has been necessary in presenting the various tabulations incident to this analysis of our material, to make combinations of the four economic classes into two, and of the ages into a few broad age groups, especially when mortality from influenza is brought into consideration, since the number of deaths is too small for minute subdivision. Even with these combinations the data are too scanty to place the results entirely beyond the influence of errors arising from chance, but the general indications seem to be fairly clear.

When the morbidity rate at different ages is compared for persons classified as "well-to-do" and in "moderate" circumstances and for persons classified as "poor" and "very poor," it is seen that the higher incidence among members of the poorer households prevailed at all ages. This is shown in the following table, in which the rates are given for 5-year age groups and for broader age groups, and in Figure 1.

TABLE XI.—*Incidence of epidemic influenza in 1918 in each age group among white persons, classified according to the general economic condition of the household, in nine localities where surveys were made*

Age group	Rate per 1,000 white persons in households classified as—		Ratio of (B) to (A)
	Well-to-do and moderate (A)	Poor and very poor (B)	
Under 5	262	339	1.29
5-9	370	412	1.11
10-14	350	390	1.11
15-19	303	349	1.15
20-24	290	331	1.14
25-29	310	378	1.22
30-34	299	375	1.25
35-39	261	348	1.33
40-44	205	281	1.38
45-49	178	245	1.37
50-54	137	237	1.73
55-59	130	197	1.51
60-64	108	190	1.76
65 and over	87	142	1.63
Under 5	262	339	1.29
5-14	360	401	1.11
15-24	297	340	1.15
25-34	305	376	1.23
35-44	235	318	1.35
45-64	145	224	1.54
65 and over	87	142	1.63

Aside from the fact of a persistently higher level of influenza morbidity among persons classified as "poor" and "very poor," there is an interesting—and possibly significant—tendency toward a relatively higher morbidity rate in the older ages among persons classified as "poor" and "very poor" than among those classified as "well-to-do" and in "moderate" circumstances. This is conveniently expressed in the ratio at each specified age of the morbidity rate for the poorer class to that for the higher economic class. The series of ratios (see Table XI) exhibit a tendency to become greater in the adult ages, reaching their maximum in old age. The ratio for children under five years of age is also relatively high.

The suggestion is afforded, therefore, that in the poorer households either the resistance to attack on the part of infants and older adults was lower, or the opportunity for their infection was greater, or both conditions obtained. In this connection, a similar comparison of the attack rates in households affected is of interest. The tabulations include only the Baltimore survey, but the number of persons is sufficiently large (15,513) to yield a fairly regular series of rates, as shown in the table following.

TABLE XII.—*Influenza attack rate in the epidemic of 1918 in each specified age group among white persons in affected households of different economic status, in areas canvassed in Baltimore*

Age group	Attack rate per 1,000 persons in households classified as—		Ratio of (B) to (A)
	Well-to-do and moderate (A)	Poor and very poor (B)	
Under 5	452	522	1.15
5-14	547	585	1.08
15-24	491	522	1.14
25-34	535	601	1.12
35-44	375	489	1.31
45-64	278	388	1.39
65 and over	180	333	1.79

Upon the assumption that all of the individuals in these households were definitely exposed, perhaps frequently, to the disease, the hypothesis that the susceptibility to attack among young children and older adults was greater in poorer households than in households economically better off would seem to be strengthened.

Case fatality.—A similar comparison of the fatality of influenza at different ages among persons of relatively poor economic condition with that among persons in moderate and well-to-do circumstances, is given in the following table and in Figure 2.

TABLE XIII.—*Fatality at each age group of cases of influenza in the epidemic of 1918, classified according to the general economic condition of the households affected*

Age group	Per cent of cases fatal in households classified as—		Ratio of (B) to (A)
	Well-to-do and moderate (A)	Poor and very poor (B)	
Under 5	1.4	2.3	1.64
5-14	.5	.4	.80
15-24	1.2	1.5	1.25
25-34	2.6	3.1	1.19
35-44	1.9	1.8	.95
45-64	1.2	2.4	2.00
65 and over	4.3	7.0	1.63

If the curves were parallel, the conclusion would be admissible that the influences connoted by the term "economic status" operated with equal force at all ages. But the curves are not parallel. As shown in the ratios given in Table XIII, the case fatality rate among poorer persons is distinctly higher than among persons economically better off in three age groups, viz, under 5 years, 15–34, and 45 and over.

What interpretation can be made of these differences, assuming that the sample is sufficiently large to warrant their serious consideration? Since so many conditions unobserved in the course of the survey may

have been involved, a definite conclusion is unwarranted. The definitely greater fatality in the older persons in the lower economic classes than in the higher economic classes suggest that their resistance, for some reason associated with their economic status, was lowered. This suggestion is upon the rather broad but generally favored hypothesis that the mortality rate among a given group of persons of middle age or over is usually a fair indication of their resistance to the effects of disease when compared with that of a standard or normal group. The greater fatality among poorer children under 5 years of age and among poorer adults under 30 or 35 years of age does not fit in with this hypothesis so well. While unfavorable heredity conceivably might be assigned as an important cause of the high fatality rate from influenza among young children in the poorer classes, other factors can not be left out of consideration. Among these factors should be included that of medical and nursing care, in which respect the poor were usually at a disadvantage. The strain upon parents who were themselves attacked at the same time as their children must have been more severe among the poor than among the well-to-do, particularly in view of the fact that the families of the poor more frequently were larger and composed of younger children than those classed as economically better off. But we can only speculate as to the various conditions that possibly or probably might have been involved. The circumstances at the time of the epidemic were such that more detailed data were not obtainable for a sufficiently large sample of our population.

REFERENCES

(1) Vaughn, Warren: A detailed review of the epidemiology of influenza, Monograph No. 1, American Journal of Hygiene, Baltimore, 1921.

(2) Ministry of Health (Great Britain): Report on Influenza, 1918–1919, Chap. VIII.

PRECEDING PAPERS ON THE EPIDEMIOLOGY OF INFLUENZA

Preceding papers from the office of statistical investigations dealing with various phases of the epidemiology of influenza are listed below:

Mortality from Influenza and Pneumonia in 50 Large Cities of the United States, 1910–1929. By S. D. Collins, W. H. Frost, Mary Gover, and Edgar Sydenstricker. Public Health Reports, Vol. 45, No. 39, Sept. 26, 1930. (Reprint 1415.)

Influenza-Pneumonia Mortality in a Group of about 95 Cities in the United States, 1920–1929. By S. D. Collins. Public Health Reports, Vol. 45, No. 8, February 21, 1930. (Reprint 1355.)

The Influenza Epidemic of 1926. Public Health Reports, August 20, 1926. (Reprint 1104.)

Variations in Case Fatality During the Influenza Epidemic of 1918. By Edgar Sydenstricker. Public Health Reports, September 9, 1920. (Reprint 692.)

Statistics of Influenza Morbidity. By W. H. Frost. Public Health Reports, March 12, 1920. (Reprint 586.)

Difficulties in Computing Civil Death Rates for 1918. By Edgar Sydenstricker and Mary L. King. Public Health Reports, February 13, 1920. (Reprint 583.)

The Epidemiology of Influenza. By W. H. Frost. Public Health Reports, August 15, 1919. (Reprint 550.)

Epidemic Influenza in Foreign Countries. By W. H. Frost and Edgar Sydenstricker. Public Health Reports, June 20, 1919. (Reprint 537.)

Influenza in Maryland. By W. H. Frost and Edgar Sydenstricker. Public Health Reports, March 14, 1919. (Reprint No. 510.)

A Comparison of the Mortality Rates by Weeks During the Influenza Epidemic of 1889-90 and during the Primary Stage of the Influenza Epidemic of 1918 in 12 Cities in the United States. Public Health Reports, January 31, 1919. (Reprint 502.)

Preliminary Statistics of the Influenza Epidemic. By Edgar Sydenstricker. Public Health Reports, Vol. 33, No. 52, December 27, 1918.

ESSENTIAL FEATURES IN THE DESIGN OF SANITARY DRINKING FOUNTAINS

The committee on plumbing of the public health engineering section of the American Public Health Association presented a report at the meeting of the association in 1929 covering the essential features in design of sanitary drinking fountains. This report [1] listed 12 details to be considered in the design, construction, and operation of drinking fountains.

Following the issuance of the report further study was given the subject, and the conference of State sanitary engineers at their 1930 meeting adopted the following as essential features of design, construction, and operation of drinking fountains:

1. The fountain shall be constructed of impervious material, such as vitreous china, porcelain, enameled cast iron, other metals, or stoneware.
2. The jet of the fountains shall issue from a nozzle of nonoxidizing, impervious material set at an angle from the vertical. The nozzle and every other opening in the water pipe or conductor leading to the nozzle shall be above the edge of the bowl so that such nozzle or opening will not be flooded in case a drain from the bowl of the fountain becomes clogged.
3. The end of the nozzle shall be protected by nonoxidizing guards to prevent persons using the fountain from coming into contact with the nozzle.
4. The inclined jet of water issuing from the nozzle shall not touch the guard, thereby causing splattering.
5. The bowl of the fountain shall be so designed and proportioned as to be free from corners which would be difficult to clean or which would collect dirt.
6. The bowl shall be so proportioned as to prevent unnecessary splashing at a point where the jet falls into the bowl.
7. The drain from the fountain shall not have a direct physical connection to a waste pipe unless the drain is trapped.
8. The water supply pipe shall be provided with an adjustable valve fitted with a loose key or an automatic valve permitting the regulation of the rate of flow of water to the fountain so that the valve manipulated by the users of the fountain will merely turn the water on or off.

[1] American Journal of Public Health and the Nation's Health. Vol. XIX, No. 11, November, 1929, pp. 1223-1226.

9. The height of the fountain at the drinking level shall be such as to be most convenient to persons utilizing the fountain. The provision of several steplike elevations to the floor at fountains will permit children of various ages to utilize the fountain.

10. The waste opening and pipe shall be of sufficient size to carry off the water promptly. The opening shall be provided with a strainer.

DEATH RATES IN A GROUP OF INSURED PERSONS

Rates for Principal Causes of Death for November, 1930

The accompanying table, taken from the Statistical Bulletin for December, 1930, issued by the Metropolitan Life Insurance Co., presents the mortality record of the industrial insurance department of the company for November, 1930, as compared with that for the preceding month and for the corresponding month of last year. It also gives the cumulative rates for the period January–November, inclusive, for the years 1930 and 1929. The rates in the table are based on a strength of approximately 19,000,000 insured persons in the United States and Canada.

The Bulletin states:

It is now safe to announce that the year 1930 will be recorded as a year of better health conditions than have ever before been enjoyed in the United States and Canada. The exact death rate can not be determined until some time after the close of the year; but the mortality record for 11 of the 12 months has been so much better than ever before registered that only a veritable health disaster in the final month could force the year's mortality rate above the previous minimum. These conclusions are based on the mortality statistics of approximately 19,000,000 industrial policyholders of the company. This group is a representative cross section of the population of the two countries. About 16,500,000 are white persons and about 2,500,000 are negroes. About 1,250,000 are Canadians. Both sexes and every age range are fully represented.

With regard to the factors contributing to this gratifying health record for the year and with reference to new low mortality rates that will probably be established for this group and for the general population, the Bulletin says:

The year has been absolutely free from the widespread prevalence of any contagious or infectious disease. The 1930 influenza death rate will be lower than in many years past. New low mortality rates will surely be established for diphtheria, tuberculosis, and puerperal conditions, and probably for typhoid fever, scarlet fever, and diarrheal complaints. There is good prospect that 1930 will mark a break in the long series of years during which the cancer death rate has been persistently increasing, and that there will be recorded, also, a drop in diabetes mortality for the first time since 1924. In addition, there is every prospect that the accident death rate will be considerably below that of 1929 and possibly below any figure recorded since 1922. Even the picture for automobile fatalities is encouraging; for, up to the end of November, there was no increase over last year's figure.

Death rates (annual basis) per 100,000 for principal causes of death

[Industrial insurance department, Metropolitan Life Insurance Co.]

Cause of death	Death rate per 100,000 lives exposed [1]				
	November, 1930	October, 1930	November, 1929	Cumulative, January–November	
				1930	1929
Total, all causes	765.3	810.3	806.3	863.7	938.8
Typhoid fever	2.6	4.4	2.5	2.2	2.4
Measles	.2	.3	.4	2.9	3.0
Scarlet fever	2.0	1.3	1.8	2.5	2.6
Whooping cough	2.3	2.7	3.8	4.3	5.9
Diphtheria	5.7	5.0	12.0	5.8	8.6
Influenza	10.7	6.7	13.4	14.4	43.1
Tuberculosis (all forms)	64.9	75.0	74.6	80.6	87.6
Tuberculosis of respiratory system	57.3	67.4	66.7	70.2	77.4
Cancer	71.3	82.4	75.3	76.7	77.3
Diabetes mellitus	16.1	16.9	16.9	18.1	18.5
Cerebral hemorrhage	55.4	55.7	[2] 51.6	59.3	[2] 57.3
Organic diseases of heart	130.1	130.4	128.6	142.5	146.6
Pneumonia (all forms)	66.6	46.5	65.4	74.9	89.0
Other respiratory diseases	9.3	9.2	9.4	10.9	12.0
Diarrhea and enteritis	19.0	38.5	15.3	20.9	21.3
Bright's disease (chronic nephritis)	60.7	61.9	64.4	66.8	69.6
Puerperal state	8.6	10.1	11.4	11.9	13.4
Suicides	9.6	10.0	7.9	9.6	8.6
Homicides	5.8	6.9	5.5	6.5	6.4
Other external causes (excluding suicides and homicides)	53.5	59.5	63.0	61.7	64.6
Traumatism by automobiles	21.1	23.4	24.3	20.3	20.3
All other causes	171.0	187.4	183.4	191.2	200.8

[1] All figures in this table include insured infants under 1 year of age. The rates for 1930 are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.
[2] Rate not comparable with that for 1930.

COURT DECISION RELATING TO PUBLIC HEALTH

Provision of law relative to certificates of unfitness for vaccination construed.—(New Hampshire Supreme Court; Covey et al. *v.* Robinson et al., 152 A. 279; decided Nov. 5, 1930.) The vaccination statute required a local board of health to issue a certificate of unfitness for vaccination "on the advice of a registered physician of the State and practicing in the town in which the child resides." The plaintiffs petitioned for a writ of mandamus to compel the defendants, as the members of the board of health of Laconia, to issue certificates that the children of the plaintiffs were unfit subjects for vaccination. A registered physician of the State had advised the defendants that the children were unfit. Such physician's office and residence were in the neighboring town of Meredith. She had attended many patients in Laconia, but the period of time that the service covered did not appear. For about six months before giving the advice as to plaintiffs' children she had attended no patients in Laconia, and at the time of giving such advice she had there no patients other than such children. Regarding the construction to be placed on the law, the supreme court said:

Here the advising physician was registered in the State, and, if the defendants found her to be practicing in Laconia when the advice was given, their duty to

give the certificates followed. The position is taken that, because her office and residence were in Meredith, she was not practicing elsewhere. This is too narrow a view of the statute. Under it no certificate could be issued for children in towns where no physicians reside or have an office. Judicial notice may be taken of the substantial number of such towns in the State. It is not probable that the legislature intended to create, if it had the power to do so, an arbitrary situation in which exemption from vaccination depended in part upon the fortune of residence in a town where a physician is located. The test suggested by plaintiff's counsel that the physician is practicing in all towns within the ordinary area of his professional activity, regardless of the number of his patients in a particular town at the time his advice is given, seems best expressive of the legislative purpose. The spirit of the statute to give equality of treatment to all is to be assumed, and to give it the restricted scope claimed by the defendants would lead to unfair discrimination.

* * * It might be found that her [the physician's] practice in Laconia was too rarely occasional to make it a part of her ordinary practice, and that it was so outside her regular practice as to be special and separate from it. In continuously holding herself ready and willing to visit any who might call her there, she did not do enough to make it a part of the territorial range of her ordinary service. There must be some measurable extent of actual practice to embrace a given place within such range. And, as of bearing, the population of Laconia may be considered. The more populous a place, the more the service required to make it ordinary. On the other hand, it might be found that her practice there, although occasional and limited, was sufficient to bring it within the required locality.

This issue of fact was for the defendants to determine.

The court said that "It was for them [the defendants] to pass upon the issue under the view of the statute herein set forth," and concluded its opinion by saying:

If the plaintiffs after amendment of their petition show that the issue was determined by an erroneous view and application of the law, the writ should be granted to the extent of requiring proper consideration of the physician's qualifications in respect to area of practice. Otherwise, it should be refused.

ANNUAL MORTALITY SUMMARY FOR 81 CITIES, 1930

Number of deaths, death rates, and infant mortality in 81 large cities in 1930 (December 29, 1929–December 27, 1930) and comparison with 1929

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

City	Total deaths[1]	Death rate[2] (per 1,000 estimated population)	Deaths under 1 year[1]	Provisional infant mortality rate, 1930[2 3]	Infant mortality rate, 1929	Mortality data for calendar year, 1929[4]		
						Total deaths	Death rate (per 1,000 estimated population)	Deaths under 1 year
Total (81 cities)	414, 609	11. 9	38, 964	[5] 58	[5] 64	432, 180	12. 6	42, 037
Akron	1, 984	7. 8	271	51	64	2, 371	9. 4	362
Albany	1, 886	14. 8	153	58	70	2, 031	16. 1	178
Atlanta	4, 156	15. 3	493	97	94	4, 191	15. 7	477
White	2, 070	(6)	227	69	75	2, 116	(6)	245
Colored	2, 086	(6)	266	147	128	2, 075	(6)	232

See footnotes at end of table.

Number of deaths, death rates, and infant mortality in 81 large cities in 1930 (December 29, 1929—December 27, 1930) and comparison with 1929—Continued

City	Total deaths [1]	Death rate [2] (per 1,000 estimated population)	Deaths under 1 year [1]	Provisional infant mortality rate, 1930 [2] [3]	Infant mortality rate, 1929	Mortality data for calendar year, 1929 [4]		
						Total deaths	Death rate (per 1,000 estimated population)	Deaths under 1 year
Baltimore	11,203	13.9	969	63	73	11,629	14.5	1,089
White	8,394	[6]	664	55	62	8,745	[6]	730
Colored	2,809	[6]	305	92	110	2,884	[6]	359
Birmingham	3,527	13.5	385	74	88	3,873	15.3	479
White	1,622	[6]	154	51	65	1,866	[6]	215
Colored	1,905	[6]	231	108	124	2,007	[6]	264
Boston	10,942	14.0	1,259	69	69	11,654	15.0	1,238
Bridgeport	1,588	10.8	144	46	71	1,750	11.9	216
Buffalo	7,375	12.9	762	60	66	7,900	13.9	773
Cambridge	1,346	11.9	121	47	57	1,423	12.6	149
Camden	1,570	13.3	207	69	71	1,674	14.1	212
Canton	1,027	9.8	133	58	66	1,149	11.1	130
Chicago	35,187	10.4	3,100	53	60	37,278	11.2	3,540
Cincinnati	6,996	15.5	574	66	77	7,510	16.8	680
Cleveland	9,897	11.0	947	53	61	10,896	12.2	1,072
Columbus	4,453	15.3	367	69	71	4,167	14.5	379
Dallas	3,000	11.5	369	[7]	[7]	2,948	11.6	367
White	2,275	[6]	288	[7]	[7]	2,201	[6]	267
Colored	725	[6]	81	[7]	[7]	747	[6]	100
Dayton	2,170	10.8	204	55	66	2,246	11.4	232
Denver	4,311	15.0	457	85	84	4,172	14.6	401
Des Moines	1,648	11.6	124	42	53	1,677	11.9	149
Detroit	14,543	9.2	2,090	64	69	16,577	10.9	2,342
Duluth	1,170	11.6	98	46	46	1,195	11.8	88
El Paso	1,750	17.1	347	[7]	[7]	1,954	19.4	404
Erie	1,274	11.0	121	43	57	1,393	12.1	135
Fall River [8]	1,321	11.5	145	63	60	1,532	13.2	149
Flint	1,396	8.9	269	66	72	1,613	10.6	319
Fort Worth	1,798	11.0	177	[7]	[7]	1,876	11.6	230
White	1,436	[6]	136	[7]	[7]	1,444	[6]	151
Colored	362	[6]	41	[7]	[7]	432	[6]	79
Grand Rapids	1,702	10.1	164	47	53	1,710	10.3	185
Houston	3,571	12.1	413	[7]	[7]	3,530	12.5	354
White	2,332	[6]	280	[7]	[7]	2,139	[6]	181
Colored	1,239	[6]	133	[7]	[7]	1,391	[6]	173
Indianapolis	5,232	14.4	321	51	68	5,318	14.7	469
White	4,299	[6]	254	46	61	4,399	[6]	371
Colored	933	[6]	67	86	110	919	[6]	98
Jersey City	3,579	11.3	423	72	67	3,902	12.4	404
Kansas City, Kans	1,438	11.8	137	54	72	1,629	13.4	162
White	1,104	[6]	114	54	68	1,223	[6]	128
Colored	334	[6]	23	56	99	406	[6]	34
Kansas City, Mo	5,258	13.1	435	63	74	5,417	13.7	464
Knoxville	1,428	13.4	170	70	80	1,401	13.5	179
White	1,110	[6]	143	65	75	1,091	[6]	150
Colored	318	[6]	27	106	135	310	[6]	29
Long Beach	1,467	10.2	83	39	39	1,470	10.8	80
Los Angeles	13,896	11.1	1,090	61	65	13,629	11.4	1,113
Louisville	4,146	13.5	305	50	72	4,634	15.1	435
White	3,119	[6]	253	48	66	3,566	[6]	350
Colored	1,027	[6]	52	66	108	1,068	[6]	85
Lowell [8]	1,310	13.1	153	75	69	1,385	13.6	136
Lynn	1,073	10.5	105	52	56	1,154	11.3	105
Memphis	4,257	16.8	436	89	95	3,878	18.9	423
White	2,070	[6]	202	65	73	2,012	[6]	211
Colored	2,187	[6]	234	130	137	1,866	[6]	212
Miami	1,222	11.0	118	57	48	1,100	9.5	91
White	836	[6]	65	44	39	746	[6]	52
Colored	386	[6]	53	90	67	354	[6]	39
Milwaukee	5,588	9.7	678	56	74	6,089	10.7	886
Minneapolis	5,003	10.8	402	50	49	4,955	10.8	391
Nashville	2,523	16.4	340	97	98	2,721	17.8	326
White	1,534	[6]	228	87	90	1,718	[6]	224
Colored	989	[6]	112	127	122	1,003	[6]	102
New Bedford [8]	1,234	11.0	105	54	66	1,350	11.9	134
New Haven	2,036	12.6	121	44	47	2,180	13.4	159
New Orleans	7,986	17.4	805	85	80	8,030	17.7	748
White	4,719	[6]	431	69	61	4,642	[6]	875
Colored	3,267	[6]	374	117	116	3,388	[6]	873

See footnotes at end of table.

***Number of deaths, death rates, and infant mortality in 81 large cities in 1930 (December 29, 1929–December 27, 1930) and comparison with 1929*—Continued**

City	Total deaths[1]	Death rate[2] (per 1,000 estimated population)	Deaths under 1 year[1]	Provisional infant mortality rate, 1930[2][3]	Infant mortality rate, 1929	Mortality data for calendar year, 1929[4]: Total deaths	Mortality data for calendar year, 1929[4]: Death rate (per 1,000 estimated population)	Mortality data for calendar year, 1929[4]: Deaths under 1 year
New York	74,563	10.7	7,063	57	59	77,433	11.3	7,299
Bronx Borough	9,998	7.8	749	33	63	11,420	9.3	1,127
Brooklyn Borough	25,120	9.8	2,723	56	56	25,761	10.6	2,775
Manhattan Borough	29,550	16.0	2,786	91	58	27,198	14.3	2,345
Queens Borough	7,704	7.1	655	34	67	9,856	9.5	878
Richmond Borough	2,182	13.7	147	51	66	2,291	14.2	178
Newark, N. J.	5,280	12.0	499	50	58	[illegible]	12.8	575
Oakland	3,149	11.1	195	48	47	[illegible]	11.3	196
Oklahoma City	2,035	10.9	285	76	66	1,869	10.5	192
Omaha	2,885	13.5	290	43	59	2,849	13.4	251
Paterson	1,668	12.1	160	73	56	1,855	13.4	166
Philadelphia	24,462	12.6	2,263	63	62	25,329	13.0	2,165
Pittsburgh	9,230	13.8	1,033	69	73	9,931	14.5	1,081
Portland, Oreg.	3,632	12.0	174	36	43	3,749	12.6	179
Providence	3,256	12.9	291	52	66	[illegible]	11.1	371
Richmond	2,715	14.9	259	73	81	2,935	16.1	291
White	1,588	(6)	107	45	55	1,708	(6)	131
Colored	1,127	(6)	152	127	131	1,227	(6)	160
Rochester	3,763	11.5	283	50	63	[illegible]	12.2	370
St. Louis	11,455	14.0	681	44	59	11,865	14.5	885
St. Paul	2,750	10.1	150	30	46	2,940	10.9	238
Salt Lake City	1,773	12.6	187	54	55	1,788	12.9	180
San Antonio	3,669	15.8	[illegible]	(7)	(7)	3,666	16.2	[illegible]
San Diego	[illegible]	11.5	122	48	49	2,156	15.0	122
San Francisco	8,291	13.0	311	40	50	8,095	13.0	382
Schenectady	1,052	11.0	82	46	71	1,158	12.1	120
Seattle	3,998	10.9	188	34	46	4,013	11.1	237
Somerville	1,004	9.7	106	76	53	947	9.2	88
South Bend	944	9.0	92	44	62	1,039	10.2	128
Spokane	1,429	12.4	87	43	56	1,482	12.9	112
Springfield, Mass.	1,813	12.1	166	49	59	1,891	12.7	179
Syracuse	2,430	11.6	233	53	56	2,622	12.7	235
Tacoma	1,326	12.4	73	36	32	[illegible]	12.2	62
Toledo	3,670	12.6	308	54	70	3,937	13.7	395
Trenton	2,019	16.4	221	74	72	1,913	15.5	195
Utica	1,483	14.6	128	64	74	1,684	16.6	139
Washington, D. C.	7,365	15.1	660	70	71	7,428	15.4	629
White	4,596	(6)	323	51	48	4,583	(6)	288
Colored	2,769	(6)	334	110	117	2,845	(6)	341
Waterbury	934	9.4	114	66	68	1,041	10.5	144
Wilmington, Del.[5]	1,537	14.5	152	63	75	1,428	13.4	162
Worcester	2,490	12.8	222	50	59	2,484	12.8	223
Yonkers	1,105	8.2	101	51	64	1,248	9.4	141
Youngstown	1,763	10.4	202	54	72	1,850	12.3	261

[1] Based upon telegraphic reports received each week from city health officers.
[2] Allowance has been made for the extra day, which must be added to the 52 weeks to give a period of 365 days.
[3] Infant mortality rate is based upon deaths under 1 year as returned each week and estimated births, 1930.
[4] Based upon deaths which occurred within the calendar year.
[5] Infant mortality rate for the cities in the birth registration area appearing in the summary.
[6] Not available.
[7] Cities with no infant mortality rate are not in the registration area for births.
[8] Mortality rates based upon population Apr. 1, 1930, decreased 1920 to 1930; no estimate made.

NOTE.—For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

DEATHS DURING WEEK ENDED JANUARY 3, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended January 3, 1931, and corresponding week of 1930. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)

	Week ended January 3, 1931	Corresponding week, 1930
Policies in force	74, 607, 778	75, 180, 975
Number of death claims	12, 754	13, 985
Death claims per 1,000 policies in force, annual rate	8. 9	9. 7

Deaths [1] from all causes in certain large cities of the United States during the week ended January 3, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Jan. 3, 1931				Corresponding week, 1930	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year
Total (81 cities)	9, 133	13. 4	817	[4] 63	13. 3	803
Akron	31	6. 3	3	30	9. 6	5
Albany [5]	28	11. 3	2	40	11. 4	1
Atlanta	109	20. 5	9	92	17. 1	13
White	55		6	95		4
Colored	54	(6)	3	86	(6)	9
Baltimore [5]	249	16. 0	24	81	15. 6	21
White	182		17	74		13
Colored	67	(6)	7	109	(6)	8
Birmingham	82	15. 9	9	91	17. 3	10
White	32		2	34		2
Colored	50	(6)	7	170	(6)	8
Boston	283	18. 8	26	74	16. 8	34
Bridgeport	35	12. 4	4	66	14. 9	6
Buffalo	152	13. 6	25	102	16. 6	28
Cambridge	38	17. 4	1	20	16. 5	4
Camden	48	21. 0	6	105	13. 6	5
Canton	18	8. 8	1	23	14. 9	4
Chicago [5]	751	11. 3	59	52	10. 9	46
Cincinnati	126	14. 4	6	36	19. 1	14
Cleveland	193	11. 0	19	55	12. 9	23
Columbus	81	14. 3	9	88	15. 9	9
Dallas	61	11. 7	12		14. 5	6
White	49		9			6
Colored	12	(6)	3		(6)	0
Dayton	50	12. 6	1	14	9. 5	6
Denver	95	17. 0	14	136	12. 6	6
Des Moines	37	13. 3	3	63	9. 8	0
Detroit	2[illegible]3	8. 3	23	37	9. 5	38
Duluth	24	12. 3	1	25	12. 8	3
El Paso	56	27. 8	16		21. 8	8
Erie	20	8. 9	2	37	7. 6	1
Fall River [5, 7]	28	12. 7	5	113	12. 7	3
Flint	29	9. 2	5	64	7. 9	4
Fort Worth	40	12. 5	4		12. 1	5
White	35		3			4
Colored	5	(6)	1		(6)	1
Grand Rapids	28	8. 5	3	44	12. 6	3
Houston	76	12. 8	8		16. 9	10
White	53		5			10
Colored	23	(6)	3		(6)	0
Indianapolis	113	15. 9	11	91	15. 7	4
White	101		10	94		2
Colored	12	(6)	1	67	(6)	2
Jersey City	71	11. 6	7	62	13. 6	11
Kansas City, Kans	30	12. 7	1	21	9. 8	2
White	24		1	25		2
Colored	6	(6)	0	0	(6)	0
Kansas City, Mo	119	15. 2	11	83	12. 2	9
Knoxville	24	11. 5	4	85	8. 3	1
White	22		4	95		0
Colored	2	(6)	0	0	(6)	1
Long Beach	42	14. 4	2	48	8. 3	1
Los Angeles	345	13. 7	23	67	12. 9	21
Louisville	81	13. 7	13	111	17. 1	11
White	66		12	118		7
Colored	15	(6)	1	66	(6)	4

See footnotes at end of table.

Deaths[1] *from all causes in certain large cities of the United States during the week ended January 3, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930*—Continued

City	Week ended Jan. 3, 1931				Corresponding week, 1930	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year
Lowell[7]	28	14.5	4	102	11.4	1
Lynn	23	11.7	0	0	8.1	1
Memphis	109	22.0	15	159	16.2	6
White	49		9	150		3
Colored	60	(6)	6	174	(6)	3
Miami	37	17.2	3	76	11.7	4
White	30		1	35		3
Colored	7	(6)	2	177	(6)	1
Milwaukee	88	7.8	11	48	12.0	22
Minneapolis	118	13.0	15	97	13.6	10
Nashville	51	17.1	5	74	21.3	6
White	27		4	80		4
Colored	24	(6)	1	59	(6)	2
New Bedford[7]	31	14.4	4	106	13.4	1
New Haven	38	12.2	0	0	14.4	2
New Orleans	205	22.9	26	143	21.6	14
White	120		15	124		8
Colored	85	(6)	11	179	(6)	6
New York	1,706	12.5	154	64	12.3	157
Bronx Borough	226	8.9	16	36	7.8	16
Brooklyn Borough	580	11.5	72	76	11.3	65
Manhattan Borough	686	19.7	49	83	18.8	60
Queens Borough	172	7.8	14	38	9.1	16
Richmond Borough	42	13.4	3	54	10.8	0
Newark, N. J	119	15.9	10	52	16.1	14
Oakland	83	14.8	4	51	14.4	6
Oklahoma City	41	10.9	3	41	6.7	3
Omaha	81	19.5	9	101	15.6	1
Paterson	28	10.5	0	0	14.7	3
Philadelphia	495	13.1	46	67	14.3	42
Pittsburgh	218	16.8	20	69	12.9	23
Portland, Oreg.	80	13.6	5	61	13.3	2
Providence	65	13.3	5	46	17.1	9
Richmond	52	14.7	9	131	15.7	6
White	30		6	131		3
Colored	22	(6)	3	130	(6)	3
Rochester	84	13.2	5	46	13.8	9
St. Louis	258	16.2	8	27	16.7	5
St. Paul	59	11.1	3	31	13.0	0
Salt Lake City[4]	52	19.0	2	30	11.5	2
San Antonio	70	15.2	11		21.7	12
San Diego	51	17.0	4	81	22.0	3
San Francisco	210	16.8	8	53	11.6	7
Schenectady	13	7.0	2	59	12.0	2
Seattle	93	13.0	4	38	11.5	5
Somerville	19	9.4	1	37	11.5	1
South Bend	20	9.7	1	25	8.9	1
Spokane	34	15.2	3	78	14.0	3
Springfield, Mass	45	15.4	2	31	14.2	2
Syracuse	54	13.2	7	83	12.7	7
Tacoma	42	20.3	4	103	10.2	0
Toledo	65	11.5	4	37	12.3	3
Trenton	57	24.0	4	70	13.5	0
Utica	29	14.8	1	26	19.5	5
Washington, D. C	164	17.3	13	72	17.3	13
White	105		6	49		7
Colored	59	(6)	7	120	(6)	6
Waterbury	23	11.9	0	0	9.4	3
Wilmington, Del.[7]	30	14.7	3	65	10.8	2
Worcester	51	13.5	2	27	17.3	7
Yonkers	23	8.6	3	79	8.1	2
Youngstown	35	10.6	2	28	9.2	0

[1] Deaths of nonresidents are included. Stillbirths are excluded.

[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.

[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.

[4] Data for 76 cities.

[5] Deaths for week ended Friday.

[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31, Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38, Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended January 10, 1931, and January 11, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended January 10, 1931, and January 11, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan. 10, 1931	Week ended Jan. 11, 1930	Week ended Jan. 10, 1931	Week ended Jan. 11, 1930	Week ended Jan. 10, 1931	Week ended Jan. 11, 1930	Week ended Jan. 10, 1931	Week ended Jan. 11, 1930
New England States								
Maine	1	4	1	8	7		0	0
New Hampshire	3	3		8	21	27	0	0
Vermont	1				14	22	0	0
Massachusetts	83	121	18	10	630	279	2	1
Rhode Island	2	16		6	1		1	0
Connecticut	17	24	10	12	271	62	1	1
Middle Atlantic States:								
New York	125	164	[1] 438	[1] 34	376	367	17	16
New Jersey	79	114	73	26	326	219	3	9
Pennsylvania	151	169			962	510	9	10
East North Central States:								
Ohio	44	74	12	31	158	494	2	9
Indiana	45	38	29		275	96	8	20
Illinois	159	181	15	20	553	367	12	14
Michigan	75	101	1	7	150	269	5	18
Wisconsin	15	20	61	102	213	566	5	0
West North Central States:								
Minnesota	10	34	1		15	186	4	4
Iowa	8	15		1	4	253	3	1
Missouri	56	41	23	46	1,100	34	8	8
North Dakota	4	8				17	2	3
South Dakota	8	1			5	41	21	3
Nebraska	6	12	3	10	18	313	1	4
Kansas	14	24		5	12	130	1	3
South Atlantic States:								
Delaware	4	10			5		0	0
Maryland [2,3]	37	25	47	54	138	15	2	1
District of Columbia	15	8	2		11	1	1	0
Virginia								
West Virginia	19	13	41	15	25	103	3	3
North Carolina	47	83	35	33	90	15	1	1
South Carolina	21	31	890	1,133	17		4	6
Georgia [3]	9	20	201	158	76	93	4	1
Florida	17	8	3	6	35	9	0	0
East South Central States:								
Kentucky		8			74	69	3	2
Tennessee	9	21	162	147	180	88	2	40
Alabama	56	25	103	204	357	24	0	2
Mississippi	11	20					1	7
West South Central States:								
Arkansas	11	9	56	120	6	2	0	5
Louisiana	46	39	138	35	5	49	5	0
Oklahoma [4]	29	43	83	164	39	45	1	2
Texas	50	102	84	87	60	6	2	0
Mountain States:								
Montana	4	1			3	29	1	3
Idaho					12	21	0	1
Wyoming		1				3	1	1
Colorado	8	10		2	41	69	3	1
New Mexico	6	8			100	9	1	0
Arizona		16	13	30	50		3	25
Utah [2]	1	1	13	4		88	2	6

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, 1931; Maryland, 1 case; and Georgia, 3 cases.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended January 10, 1931, and January 11, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan 10, 1931	Week ended Jan 11, 1930	Week ended Jan. 10, 1931	Week ended Jan. 11, 1930	Week ended Jan 10, 1931	Week ended Jan. 11, 1930	Week ended Jan. 10, 1931	Week ended Jan. 11, 1930
Pacific States:								
Washington	9	9	------	4	39	47	3	3
Oregon	6	10	39	46	67	15	1	0
California	62	60	92	76	272	112	8	11

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Jan 10, 1931	Week ended Jan 11, 1930	Week ended Jan. 10, 1931	Week ended Jan 11, 1930	Week ended Jan 10, 1931	Week ended Jan. 11, 1930	Week ended Jan 10, 1931	Week ended Jan. 11, 1930
New England States.								
Maine	0	0	18	45	0	0	4	1
New Hampshire	0	0	4	16	0	0	0	0
Vermont	0	0	9	12	0	1	1	0
Massachusetts	2	1	274	349	0	0	6	4
Rhode Island	0	0	31	35	0	0	0	0
Connecticut	0	0	57	129	0	0	0	0
Middle Atlantic States.								
New York	3	1	611	492	11	13	11	11
New Jersey	1	0	219	232	0	0	2	3
Pennsylvania	2	1	552	466	1	0	22	17
East North Central States								
Ohio	4	0	527	279	92	159	9	6
Indiana	1	0	287	177	90	205	3	4
Illinois	3	0	446	567	50	158	5	10
Michigan	0	0	258	321	16	70	7	0
Wisconsin	1	1	122	138	0	43	1	2
West North Central States.								
Minnesota	0	0	54	101	12	10	0	2
Iowa	4	0	156	73	37	121	1	1
Missouri	2	0	165	41	28	37	6	5
North Dakota	1	0	35	49	15	34	0	0
South Dakota	0	0	16	16	34	30	1	0
Nebraska	2	1	49	60	59	140	1	0
Kansas	2	0	53	118	106	52	4	2
South Atlantic States								
Delaware	0	0	22	22	0	0	0	0
Maryland [2,3]	0	2	83	102	0	0	2	5
District of Columbia	0	0	43	19	0	0	1	0
Virginia	---	---	---		1	---	---	---
West Virginia	0	1	37	72	8	23	10	10
North Carolina	0	0	75	96	7	55	6	0
South Carolina	0	0	16	27	1	0	4	9
Georgia [3]	0	0	43	14	0	0	7	6
Florida	0	0	4	14	6	0	1	1
East South Central States								
Kentucky	1	0	89	69	11	23	2	0
Tennessee	1	1	17	45	4	6	3	7
Alabama	0	0	48	28	2	45	0	1
Mississippi	2	0	19	26	9	1	3	2
West South Central States								
Arkansas	0	0	70	21	11	12	5	7
Louisiana	1	0	8	21	6	12	14	14
Oklahoma [4]	0	0	38	47	40	34	8	16
Texas	1	0	51	73	48	97	9	4
Mountain States.								
Montana	0	0	43	46	8	9	2	1
Idaho	0	0	4	9	1	11	0	0
Wyoming	1	0	16	1	1	12	0	0
Colorado	0	0	34	36	24	25	1	0
New Mexico	0	2	7	7	2	2	1	1
Arizona	0	0	2	13	0	34	0	2
Utah [1]	0	0	4	17	2	0	0	0
Pacific States:								
Washington	0	3	32	75	27	108	3	0
Oregon	0	0	22	39	10	15	0	3
California	5	3	97	299	59	77	4	7

[1] Week ended Friday.
[3] Typhus fever, 1931: Maryland, 1 case; and Georgia, 3 cases.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
October, 1930										
Florida		74	4	102	14	6	2	21	4	11
November, 1930										
District of Columbia	5	36	6		14	1	0	102	0	6
Mississippi	7	326	1,782	2,022	74	385	3	169	12	137
December, 1930										
Connecticut	7	68	9		483		1	293	0	21
District of Columbia	4	56	8		43		3	110	0	4
Massachusetts	11	348	28	5	1,280	2	31	1,022	0	25
Nebraska	7	54	13		6		13	180	173	5
Tennessee	19	143	324	16	136	7	2	282	15	35
Vermont		15			30		0	29	2	5
Wyoming	4	4	11		2		1	63	3	3

	Cases
October, 1930	
Florida:	
Chicken pox	4
Dysentery	2
Mumps	11
Typhus fever	5
Whooping cough	19
November, 1930	
Chicken pox:	
District of Columbia	38
Mississippi	322
Dengue:	
Mississippi	3
Dysentery:	
Mississippi (amebic)	18
Mississippi (bacillary)	331
Hookworm disease	
Mississippi	230
Mumps:	
Mississippi	113
Ophthalmia neonatorum:	
Mississippi	10
Puerperal septicemia:	
Mississippi	24
Rabies in animals:	
Mississippi	7
Trachoma:	
Mississippi	8
Whooping cough:	
District of Columbia	7
Mississippi	412
December, 1930	
Anthrax:	
Massachusetts	1
Chicken pox:	
Connecticut	337
District of Columbia	83
Massachusetts	1,842
Nebraska	217
Tennessee	283
Vermont	219
Wyoming	149
Conjunctivitis	
Wyoming	1
Dysentery	
Connecticut (bacillary)	1
Massachusetts	3
German measles:	
Massachusetts	139
Impetigo contagiosa:	
Tennessee	2
Lead poisoning:	
Connecticut	1
Massachusetts	1
Lethargic encephalitis:	
Connecticut	1
Massachusetts	3
Mumps	
Connecticut	201
Massachusetts	263
Nebraska	67
Tennessee	62
Vermont	7
Wyoming	28
Ophthalmia neonatorum:	
Massachusetts	78
Tennessee	1
Puerperal septicemia:	
Tennessee	1
Rabies in animals:	
Connecticut	5
Septic sore throat:	
Connecticut	10
Massachusetts	17
Tennessee	7
Vermont	3
Wyoming	1
Tetanus:	
Connecticut	1
Massachusetts	2
Tennessee	1
Trachoma:	
Connecticut	1
Massachusetts	6

	Cases
Trichinosis:	
Connecticut	1
Massachusetts	3
Tularaemia:	
Tennessee	8
Typhus fever:	
District of Columbia	1
Undulant fever:	
Connecticut	9
Nebraska	2
Vermont	2

	Cases
Vincent's angina:	
Tennessee	7
Whooping cough:	
Connecticut	221
District of Columbia	17
Massachusetts	488
Nebraska	36
Tennessee	47
Vermont	57
Wyoming	92

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,220,000. The estimated population of the 88 cities reporting deaths is more than 24,585,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended January 3, 1931, and January 4, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,483	1,736	986
96 cities	500	715	
Measles			
45 States	4,943	1,542	
96 cities	1,718	793	
Meningococcus meningitis			
46 States	121	201	
96 cities	47	91	
Poliomyelitis:			
46 States	65	20	
Scarlet fever			
46 States	4,475	4,303	
96 cities	1,428	1,508	1,344
Smallpox:			
46 States	670	1,266	
96 cities	43	122	40
Typhoid fever:			
46 States	196	147	
96 cities	33	16	31
Deaths reported			
Influenza and pneumonia:			
88 cities	780	810	
Smallpox:			
88 cities	0	0	

City reports for week ended January 3, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

City reports for week ended January 3, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
NEW ENGLAND								
Maine:								
Portland	23	1	0	1	0	0	3	1
New Hampshire:								
Concord	0	0	0	----------	0	1	0	0
Nashua	0	0	0	----------	0	0	0	0
Vermont:								
Barre	0	0	0	----------	0	0	0	1
Burlington	0	0	0	----------	0	0	0	0
Massachusetts:								
Boston	61	36	21	2	1	57	5	31
Fall River	6	4	1	----------	0	0	6	5
Springfield	6	5	6	----------	0	1	1	1
Worcester	21	5	15	2	1	3	0	2
Rhode Island:								
Pawtucket	7	2	3	----------	0	0	0	6
Providence	21	11	2	----------	0	0	0	6
Connecticut:								
Bridgeport	1	7	0	----------	1	0	0	4
Hartford	----------	7	----------	----------	----------	----------	----------	----------
New Haven	2	1	0	----------	0	7	1	5
MIDDLE ATLANTIC								
New York:								
Buffalo	20	15	6	----------	0	20	24	19
New York	----------	210	97	68	----------	76	----------	----------
Rochester	7	8	1	----------	0	0	2	6
Syracuse	28	4	0	----------	0	2	0	5
New Jersey:								
Camden	2	6	1	----------	0	41	0	3
Newark	32	2	17	9	0	3	13	15
Trenton	0	3	0	----------	0	0	0	4
Pennsylvania:								
Philadelphia	117	72	17	6	6	48	10	63
Pittsburgh	64	21	10	----------	4	7	5	35
Reading	16	2	0	----------	0	25	11	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	7	12	2	----------	0	6	6	14
Cleveland	88	34	9	7	1	6	33	20
Columbus	4	6	3	----------	0	1	1	12
Toledo	70	10	9	----------	0	1	3	5
Indiana:								
Fort Wayne	5	5	1	----------	1	37	0	1
Indianapolis	28	10	10	----------	1	4	4	13
South Bend	3	1	0	----------	0	0	0	2
Terre Haute	1	0	1	----------	2	0	0	1
Illinois:								
Chicago	116	121	82	10	4	18	46	56
Springfield	0	2	1	----------	0	4	0	3
Michigan:								
Detroit	92	62	29	1	1	1	13	28
Flint	10	4	0	----------	1	4	4	2
Grand Rapids	3	2	1	----------	0	1	0	2
Wisconsin:								
Kenosha	44	1	0	----------	0	0	9	0
Madison	23	0	3	----------	----------	0	5	----------
Milwaukee	71	18	5	1	1	6	42	12
Racine	10	2	2	----------	0	1	0	0
Superior	4	1	0	----------	0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	1	1	0	----------	0	0	0	0
Minneapolis	4	21	4	----------	0	2	6	9
St. Paul	36	10	3	----------	0	0	0	9
Iowa:								
Davenport	0	0	0	----------	----------	1	0	----------
Des Moines	2	2	0	----------	----------	0	1	----------
Sioux City	10	1	3	----------	----------	0	2	----------
Waterloo	18	0	0	----------	----------	0	0	----------

City reports for week ended January 3, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
WEST NORTH CENTRAL—continued								
Missouri:								
Kansas City	17	7	8	----------	1	3	0	21
St. Joseph	3	1	0	----------	0	1	0	6
St. Louis	33	44	20	----------	----------	968	8	----------
North Dakota:								
Fargo	6	0	0	----------	0	0	2	0
Grand Forks	0	0	0	----------	----------	0	0	----------
South Dakota:								
Aberdeen	2	0	0	----------	----------	1	0	----------
Nebraska:								
Omaha	10	6	4	----------	0	3	4	7
Kansas:								
Topeka	14	2	1	1	0	1	0	4
Wichita	7	2	0	----------	0	0	0	4
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	3	1	----------	0	1	0	5
Maryland:								
Baltimore	110	29	6	8	4	52	15	42
Cumberland	0	0	0	----------	0	0	0	2
Frederick	0	1	0	----------	0	0	1	0
District of Columbia:								
Washington	27	17	5	1	1	14	0	18
Virginia:								
Lynchburg	7	2	0	----------	0	1	0	2
Norfolk	8	2	1	----------	0	1	0	3
Richmond	0	6	3	----------	0	26	1	2
Roanoke	4	2	1	----------	0	0	0	2
West Virginia:								
Charleston	0	1	2	----------	0	0	5	2
Wheeling	16	1	1	----------	0	0	0	3
North Carolina:								
Raleigh	4	1	1	----------	0	0	0	2
Wilmington	7	1	1	----------	0	0	0	1
Winston-Salem	6	1	0	----------	0	1	0	1
South Carolina:								
Charleston	0	1	2	102	1	3	4	11
Columbia	20	0	0	----------	0	0	14	4
Georgia:								
Atlanta	3	5	5	13	4	59	0	9
Brunswick	0	0	0	----------	0	0	0	1
Savannah	0	1	1	12	0	0	0	5
Florida:								
Miami	1	2	0	----------	1	1	1	3
Tampa	0	2	2	----------	0	4	0	3
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	1	2	----------	0	0	0	2
Tennessee:								
Memphis	31	5	2	----------	3	1	0	10
Nashville	0	1	0	----------	0	0	0	5
Alabama:								
Birmingham	7	4	5	2	0	153	5	12
Mobile	1	1	3	3	1	0	0	3
Montgomery	0	0	0	4	----------	0	0	----------
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	1	1	0	----------	----------	0	0	----------
Little Rock	0	1	0	----------	0	1	0	0
Louisiana:								
New Orleans	0	13	21	12	16	0	0	24
Shreveport	4	2	0	----------	0	0	0	4
Oklahoma:								
Muskogee	1	0	1	----------	0	0	0	0
Tulsa	9	2	3	----------	----------	10	2	----------
Texas:								
Dallas	8	11	8	2	3	5	2	8
Fort Worth	0	5	1	----------	0	0	0	7
Galveston	1	1	1	----------	0	0	0	3
Houston	2	8	5	----------	4	0	0	7
San Antonio	2	8	4	----------	3	1	0	10

City reports for week ended January 3, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
MOUNTAIN								
Montana:								
Billings	0	1	0	----------	0	0	0	1
Great Falls	5	0	0	----------	0	0	1	0
Helena	2	0	0	----------	0	0	0	0
Missoula	0	0	0	----------	0	0	0	0
Idaho:								
Boise	6	0	0	----------	1	1	0	2
Colorado:								
Denver	----------	8	----------	----------	----------	----------	----------	----------
Pueblo	5	1	0	----------	0	22	0	4
New Mexico:								
Albuquerque	6	0	0	----------	0	0	0	7
Arizona								
Phoenix	1	0	0	----------	0	0	0	0
Utah:								
Salt Lake City	10	4	4	----------	1	3	8	7
Nevada.								
Reno	1	0	1	----------	0	0	0	1
PACIFIC								
Washington:								
Seattle	7	5	4	----------	----------	2	15	----------
Spokane	10	2	0	----------	----------	0	0	----------
Tacoma	9	2	2	----------	0	0	2	4
Oregon								
Portland	18	11	0	----------	0	2	5	9
Salem	0	0	0	----------	0	2	3	0
California:								
Los Angeles	47	39	12	29	4	4	12	37
Sacramento	2	2	5	1	0	0	2	5
San Francisco	14	16	4	3	0	6	0	8

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases, reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	3	4	0	0	0	1	0	0	0	43	25
New Hampshire:											
Concord	1	0	0	0	0	1	0	0	0	0	14
Nashua	0	0	0	0	0	0	0	0	0	0	--------
Vermont.											
Barre	0	0	0	0	0	0	0	0	0	2	5
Burlington	1	0	0	0	0	0	0	0	0	0	8
Massachusetts.											
Boston	78	50	0	0	0	11	1	1	0	25	283
Fall River	3	5	0	0	0	1	0	0	0	4	28
Springfield	9	6	0	0	0	1	0	0	0	0	48
Worcester	12	21	0	0	0	2	0	0	0	3	51
Rhode Island:											
Pawtucket	2	14	0	0	0	1	0	0	0	0	25
Providence	11	13	0	0	0	1	0	0	0	3	65
Connecticut.											
Bridgeport	10	9	0	0	0	1	0	0	0	1	35
Hartford	7	-------	0	-------	-------	-------	0	-------	-------	-------	-------
New Haven	6	5	0	0	0	1	0	0	0	3	38
MIDDLE ATLANTIC											
New York:											
Buffalo	26	32	0	0	0	4	1	0	0	28	147
New York	209	156	0	0	-------	-------	8	4	-------	-------	1,706
Rochester	9	66	0	0	0	2	0	1	0	19	80
Syracuse	13	17	0	0	0	0	0	0	0	11	54

City reports for week ended January 3, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases, reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
MIDDLE ATLANTIC—continued											
New Jersey:											
Camden	6	1	0	0	0	1	0	0	0	1	48
Newark	28	22	0	0	0	15	0	1	0	28	117
Trenton	4	11	0	0	0	8	0	1	1	0	57
Pennsylvania:											
Philadelphia	94	158	0	0	0	26	2	1	0	20	495
Pittsburgh	37	42	0	0	0	9	0	0	0	19	218
Reading	3	0	0	0	0	1	0	0	0	0	21
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	19	37	0	0	0	9	1	1	0	4	123
Cleveland	43	42	0	0	0	13	1	0	0	9	193
Columbus	10	12	0	0	0	2	0	0	0	1	81
Toledo	13	12	1	0	0	4	0	0	0	6	65
Indiana:											
Fort Wayne	5	2	1	0	0	0	0	0	0	0	20
Indianapolis	10	18	5	8	0	5	0	0	0	5	-------
South Bend	3	4	0	0	0	3	0	0	0	1	20
Terre Haute	3	4	0	0	0	3	0	0	0	0	23
Illinois:											
Chicago	128	172	1	0	0	52	0	5	1	46	751
Springfield	2	6	0	0	0	0	0	1	0	0	26
Michigan:											
Detroit	101	86	2	0	0	25	2	0	0	20	263
Flint	13	2	1	0	0	3	0	0	0	1	29
Grand Rapids	12	14	1	0	0	2	1	0	0	7	28
Wisconsin:											
Kenosha	2	4	0	0	0	0	0	0	0	0	14
Madison	3	2	0	0	-------	-------	0	0	-------	0	-------
Milwaukee	33	13	0	0	0	4	0	0	0	20	88
Racine	6	2	0	0	0	0	0	0	0	4	10
Superior	3	2	0	0	0	0	0	0	0	0	4
WEST NORTH CENTRAL											
Minnesota:											
Duluth	11	1	0	0	0	1	0	0	0	0	24
Minneapolis	53	5	1	0	0	2	0	0	0	2	118
St. Paul	31	8	4	0	0	1	0	0	0	3	63
Iowa:											
Davenport	2	1	1	2	-------	-------	0	0	-------	0	-------
Des Moines	10	4	2	6	-------	-------	0	0	-------	0	37
Sioux City	1	11	1	0	-------	-------	0	1	-------	0	-------
Waterloo	2	1	0	0	-------	-------	0	0	-------	1	-------
Missouri:											
Kansas City	18	5	0	1	0	8	0	0	0	1	119
St. Joseph	2	5	0	0	0	0	0	0	0	0	29
St. Louis	37	67	1	0	0	18	1	0	1	7	258
North Dakota:											
Fargo	2	1	0	0	0	0	0	0	0	0	8
Grand Forks	1	0	0	0	-------	-------	0	0	-------	2	-------
South Dakota:											
Aberdeen	0	0	0	0	-------	-------	0	0	-------	0	-------
Nebraska:											
Omaha	5	12	2	16	0	2	0	0	0	9	81
Kansas:											
Topeka	4	1	0	0	0	0	0	0	0	2	28
Wichita	5	6	0	7	0	0	0	0	0	2	22
SOUTH ATLANTIC											
Delaware:											
Wilmington	5	9	0	0	0	0	0	0	0	4	30
Maryland:											
Baltimore	33	38	0	0	0	13	2	1	0	8	249
Cumberland	1	2	0	0	0	0	0	0	0	0	14
Frederick	0	0	0	0	0	0	0	0	0	0	3
District of Col.:											
Washington	24	30	0	0	0	8	1	0	0	12	164

City reports for week ended January 3, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases, reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
SOUTH ATLANTIC—continued											
Virginia:											
Lynchburg	1	3	0	0	0	1	0	1	0	0	17
Norfolk	2	1	0	0	0	1	0	0	0	4	-------
Richmond	6	12	0	0	0	6	0	0	0	5	50
Roanoke	2	2	0	0	0	0	0	0	0	0	21
West Virginia:											
Charleston	2	0	0	0	0	1	0	0	0	0	25
Wheeling	2	4	0	0	0	1	0	0	0	0	17
North Carolina:											
Raleigh	1	0	0	0	0	0	0	0	0	3	11
Wilmington	0	0	0	0	0	0	0	0	0	3	18
Winston-Salem	3	10	1	0	0	1	0	0	0	0	17
South Carolina:											
Charleston	0	0	0	0	0	3	0	0	0	0	28
Columbia	1	0	0	0	0	3	0	0	0	0	35
Georgia:											
Atlanta	5	18	1	0	0	4	0	0	0	2	107
Brunswick	0	0	0	0	0	0	0	0	0	0	4
Savannah	1	1	0	0	0	2	1	0	0	0	37
Florida:											
Miami	2	3	0	0	0	1	0	0	0	1	37
Tampa	1	2	0	0	0	1	0	0	0	0	35
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	13	0	0	0	0	0	0	0	0	28
Tennessee:											
Memphis	7	25	0	0	0	9	1	0	1	1	109
Nashville	2	0	0	0	0	4	1	0	1	0	51
Alabama:											
Birmingham	4	8	1	0	0	13	1	5	0	1	82
Mobile	0	3	0	0	0	2	0	0	0	0	29
Montgomery	1	1	0	0	-------	-------	0	3	-------	7	-------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	1	0	0	-------	-------	0	0	-------	0	-------
Little Rock	2	1	0	0	0	0	0	0	0	0	-------
Louisiana:											
New Orleans	7	11	0	2	0	13	3	0	0	0	205
Shreveport	2	1	0	0	0	1	0	0	0	0	36
Oklahoma:											
Muskogee	1	0	1	0	0	0	0	0	0	0	-------
Tulsa	2	6	0	8	-------	-------	0	0	-------	0	-------
Texas:											
Dallas	6	6	0	0	0	1	0	1	0	6	61
Fort Worth	2	4	1	0	0	1	0	0	1	0	40
Galveston	0	1	0	0	0	2	0	0	0	0	12
Houston	4	5	2	3	0	3	0	0	0	0	76
San Antonio	1	5	0	0	0	4	0	0	0	0	70
MOUNTAIN											
Montana:											
Billings	2	0	0	1	0	0	0	0	0	1	5
Great Falls	3	2	0	0	0	0	0	0	0	5	7
Helena	1	1	0	0	0	0	0	0	0	1	1
Missoula	0	0	0	0	0	0	0	0	0	0	6
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	0	11
Colorado:											
Denver	12	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Pueblo	2	1	0	0	0	2	0	0	0	5	13
New Mexico:											
Albuquerque	1	0	0	0	0	5	0	0	0	4	18
Arizona:											
Phoenix	0	0	0	0	0	0	0	0	0	0	-------
Utah:											
Salt Lake City	4	1	1	0	0	2	0	2	0	13	52
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	8

City reports for week ended January 3, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases, reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
PACIFIC											
Washington:											
Seattle	9	10	2	0			1	1		16	
Spokane	9	3	4	0			0	0		2	
Tacoma	3	3	3	1	0	1	0	0	0	1	42
Oregon											
Portland	6	0	8	2	0	3	1	0	0	0	
Salem	0	0	0	0	0	0	0	0	0	0	
California:											
Los Angeles	37	17	3	1	0	21	1	1	0	12	345
Sacramento	2	1	1	0	0	2	0	1	1	3	35
San Francisco	17	2	2	3	0	11	1	0	0	7	188

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	4	0
Massachusetts:									
Boston	0	0	0	1	0	0	0	2	0
Springfield	0	0	0	1	0	0	0	0	0
Worcester	0	0	0	0	0	0	0	1	1
Rhode Island:									
Providence	0	0	0	1	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
Buffalo	1	0	0	0	0	0	0	0	0
New York	7	0	0	0	0	0	1	1	0
New Jersey:									
Newark	0	0	1	0	0	0	0	0	0
Pennsylvania									
Philadelphia	2	1	0	0	0	0	0	1	0
Pittsburgh	1	1	0	0	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	2	1	0	0	0	0	0	0	0
Cleveland	2	0	0	0	0	0	0	0	0
Indiana:									
Indianapolis	5	4	0	0	0	0	0	0	0
Illinois:									
Chicago	6	2	0	0	0	0	0	3	0
Michigan:									
Detroit	3	0	0	0	0	0	0	0	0
Flint	1	0	0	0	0	0	0	0	0
Wisconsin:									
Milwaukee	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	2	0	0	0	0	0	0	1	0
Iowa:									
Des Moines	1	0	0	0	0	0	0	0	0
Waterloo	0	1	0	0	0	0	0	0	0
Missouri:									
Kansas City	0	0	1	1	0	0	0	1	0
St. Louis	2	1	0	0	0	0	0	0	0

City reports for week ended January 3, 1931—**Continued**

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
SOUTH ATLANTIC									
District of Columbia.									
Washington	0	0	0	0	0	0	0	3	2
Virginia:									
Lynchburg	0	0	0	0	8	0	0	0	0
Richmond	0	0	0	0	0	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	2	1	0	0	0
Columbia	2	1	0	0	0	2	0	0	0
Georgia.									
Atlanta	1	0	0	0	2	2	0	0	0
Savannah [1]	0	0	0	0	2	2	0	0	0
EAST SOUTH CENTRAL									
Tennessee·									
Memphis	1	1	0	0	0	0	0	0	0
Alabama.									
Birmingham	0	0	0	0	0	1	0	0	0
Montgomery	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Arkansas									
Little Rock	0	0	0	0	0	2	0	0	0
Louisiana:									
New Orleans	1	1	0	0	0	0	0	0	
Texas·									
Dallas	0	0	0	0	1	1	0	0	0
Fort Worth	0	0	0	0	0	0	0	0	1
Houston	0	0	0	0	0	1	0	1	0
San Antonio	1	0	0	0	0	0	0	1	0
MOUNTAIN									
Montana·									
Great Falls	1	0	0	0	0	0	0	0	0
Utah:									
Salt Lake City	0	1	0	0	0	0	0	1	1
PACIFIC									
California:									
Los Angeles	3	1	0	0	0	0	0	1	0
Sacramento	2	1	0	0	0	0	0	2	0
San Francisco	1	1	0	0	0	0	0	3	1

[1] Typhus fever. 2 cases at Savannah, Ga.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended January 3, 1931, compared with those for a like period ended January 4, 1930. The population figures used in computing the rates previous to 1931 are approximate estimates. Those used in computing the rates for the weeks ended January 3 and January 4 are estimated midyear populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities November 30, 1930, to January 3, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929–30 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929	Dec. 27, 1930	Dec. 28, 1929	Jan. 3, 1931	Jan. 4, 1930
98 cities	[2] 92	146	[3] 89	131	[3] 97	128	[4] 73	120	[5] 78	113
New England	111	112	117	117	131	168	69	126	[6] 119	141
Middle Atlantic	61	110	40	112	65	106	49	113	66	81
East North Central	113	191	121	170	117	167	103	107	89	153
West North Central	99	121	95	148	87	110	53	67	82	116
South Atlantic	[7] 104	127	112	107	99	107	79	79	61	94
East South Central	162	226	155	137	94	123	94	109	70	102
West South Central	[3] 159	302	[3] 147	293	[3] 219	225	153	171	132	181
Mountain	17	157	26	61	17	61	[4] 67	35	[8] 85	53
Pacific	76	84	64	58	97	56	47	82	53	99

MEASLES CASE RATES

	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929	Dec. 27, 1930	Dec. 28, 1929	Jan. 3, 1931	Jan. 4, 1930
98 cities	[2] 145	98	[3] 166	113	[3] 198	109	[4] 185	91	[5] 270	126
New England	202	81	250	85	248	92	279	90	[6] 171	129
Middle Atlantic	89	54	89	47	91	59	74	51	98	72
East North Central	28	93	26	133	28	94	28	97	54	117
West North Central	933	216	1,055	202	1,387	210	1,250	146	1,871	283
South Atlantic	[7] 57	4	73	28	126	36	114	30	318	144
East South Central	175	14	337	14	310	0	364	0	896	6
West South Central	[3] 12	46	[3] 8	61	[3] 20	133	26	88	24	91
Mountain	51	165	146	104	163	139	[4] 258	78	[8] 441	203
Pacific	31	377	31	464	7	418	19	326	24	261

SCARLET FEVER CASE RATES

	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929	Dec. 27, 1930	Dec. 28, 1929	Jan. 3, 1931	Jan. 4, 1930
98 cities	[2] 207	252	[3] 229	277	[3] 239	249	[4] 227	216	[5] 224	242
New England	246	276	237	375	321	310	323	299	[6] 315	391
Middle Atlantic	187	148	196	172	219	176	200	165	224	175
East North Central	259	400	318	438	309	355	288	311	255	341
West North Central	194	231	205	271	273	235	241	179	235	254
South Atlantic	[7] 211	159	238	193	190	253	163	144	259	202
East South Central	337	144	425	89	223	48	385	75	291	114
West South Central	[3] 100	156	[3] 94	137	[3] 80	99	64	122	105	80
Mountain	137	392	206	322	292	583	[4] 401	322	[8] 85	388
Pacific	113	355	83	340	97	244	99	246	71	225

SMALLPOX CASE RATES

	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929	Dec. 27, 1930	Dec. 28, 1929	Jan. 3, 1931	Jan. 4, 1930
98 cities	[2] 7	19	[3] 15	23	[3] 9	23	[4] 7	18	[5] 7	19
New England	0	0	0	2	0	0	0	0	[6] 0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	1	26	3	29	6	31	3	20	5	16
West North Central	47	64	120	56	47	60	42	58	46	81
South Atlantic	[7] 0	0	0	0	0	0	0	2	0	2
East South Central	0	0	0	0	0	7	0	7	0	0
West South Central	[3] 4	19	[3] 8	34	[3] 16	34	19	27	17	14
Mountain	103	78	146	78	112	52	[4] 45	44	[8] 17	53
Pacific	12	60	7	118	12	113	24	77	10	29

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1931, 1930, and 1929, respectively.
[2] Raleigh, N. C., and Shreveport, La., not included.
[3] Shreveport, La., not included.
[4] Salt Lake City, Utah, not included.
[5] Hartford, Conn., and Denver, Colo., not included.
[6] Hartford, Conn., not included.
[7] Raleigh, N. C., not included.
[8] Denver, Colo., not included.

Summary of weekly reports from cities November 30, 1930, to January 3, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929–30—Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929	Dec. 27, 1930	Dec. 28, 1929	Jan. 3, 1931	Jan. 4, 1930
98 cities	[2] 10	5	[3] 8	6	[3] 9	5	[4] 7	4	[5] 5	3
New England	7	2	18	7	9	0	2	2	[6] 2	2
Middle Atlantic	8	4	7	6	3	4	3	3	4	1
East North Central	10	4	7	3	9	3	13	1	4	2
West North Central	6	2	6	6	8	8	6	2	2	0
South Atlantic	[7] 17	6	4	7	11	4	15	9	4	6
East South Central	13	48	20	14	40	0	20	34	47	6
West South Central	[3] 28	0	[3] 25	8	[3] 28	38	0	8	3	0
Mountain	9	23	0	9	9	17	[4] 11	0	[8] 34	9
Pacific	12	10	7	7	7	2	7	10	6	8

INFLUENZA DEATH RATES

	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929	Dec. 27, 1930	Dec. 28, 1929	Jan. 3, 1931	Jan. 4, 1930
91 cities	[2] 10	17	[3] 10	16	[3] 10	19	[4] 12	19	[9] 15	16
New England	4	11	4	7	2	9	2	9	[6] 7	7
Middle Atlantic	6	14	8	9	5	18	11	13	[10] 11	9
East North Central	8	9	5	15	10	14	8	13	7	15
West North Central	12	27	21	12	15	15	9	15	3	27
South Atlantic	[7] 19	28	22	19	18	13	22	26	20	20
East South Central	15	60	29	60	37	52	22	30	25	20
West South Central	[3] 37	47	[3] 12	78	[3] 25	66	34	94	90	71
Mountain	17	17	9	0	17	26	[4] 0	26	[8] 34	18
Pacific	3	13	9	19	12	28	21	19	10	10

PNEUMONIA DEATH RATES

	Dec. 6, 1930	Dec. 7, 1929	Dec. 13, 1930	Dec. 14, 1929	Dec. 20, 1930	Dec. 21, 1929	Dec. 27, 1930	Dec. 28, 1929	Jan. 3, 1931	Jan. 4, 1930
91 cities	[2] 102	136	[3] 109	150	[3] 114	158	[4] 130	143	[9] 150	165
New England	66	74	109	135	106	157	109	94	[6] 154	169
Middle Atlantic	107	139	109	156	133	165	132	155	[10] 167	170
East North Central	78	126	86	116	70	117	95	116	101	114
West North Central	130	123	145	174	95	180	115	174	177	197
South Atlantic	[7] 143	131	123	191	126	184	159	152	227	240
East South Central	177	239	140	216	125	216	184	194	202	227
West South Central	[3] 139	238	[3] 176	230	[3] 147	234	203	234	186	295
Mountain	129	165	154	192	215	235	[4] 235	209	[8] 254	185
Pacific	74	138	74	107	156	138	166	104	130	92

[2] Raleigh, N. C., and Shreveport, La., not included.
[3] Shreveport, La., not included.
[4] Salt Lake City, Utah, not included.
[6] Hartford, Conn., not included.
[7] Raleigh, N. C., not included.
[8] Denver, Colo., not included.
[9] Hartford, Conn., New York City, N. Y., and Denver, Colo., not included.
[10] New York City, N. Y., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended January 3, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended January 3, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia		3			
New Brunswick					1
Quebec		1			6
Ontario	3			8	3
Manitoba	1		2		2
Saskatchewan [1]					
Alberta				19	1
British Columbia			1	1	2
Total	4	4	3	28	15

[1] No case of any disease included in the table was reported during the week

Quebec Province—Communicable diseases—Week ended January 3, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended January 3, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	53	Mumps	12
Diphtheria	32	Ophthalmia neonatorum	1
Erysipelas	1	Scarlet fever	77
German measles	1	Tuberculosis	17
Influenza	1	Typhoid fever	6
Measles	26	Whooping cough	23

Quebec Province—Vital statistics—September, 1930.—Births, deaths, and marriages for the month of September, 1930, in the Province of Quebec, Canada, with deaths from certain specified causes, are shown in the following table:

Estimated population	2,735,000
Births	6,348
Birth rate per 1,000 population	28.2
Deaths	2,866
Death rate per 1,000 population	12.7
Marriages	2,086
Deaths under 1 year	1,011
Deaths under 1 year per 1,000 births	159.3
Deaths from—	
Cancer	166
Cerebrospinal meningitis	1
Diabetes	18
Diarrhea	499
Diphtheria	15
Deaths from—Continued.	
Heart disease	250
Influenza	13
Measles	6
Pneumonia	102
Poliomyelitis	1
Scarlet fever	9
Smallpox	1
Syphilis	9
Tuberculosis (pulmonary)	161
Tuberculosis (other forms)	48
Typhoid fever	28
Violence	127
Whooping cough	32

CUBA

Habana—Communicable diseases—December, 1930.—During the month of December, 1930, certain communicable diseases were reported in the city of Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	4		Scarlet fever	1	
Diphtheria	17	3	Tuberculosis	44	10
Malaria [1]	20	2	Typhoid fever [1]	10	1
Measles	3				

[1] Many of these cases are from the Island of Cuba, outside of Habana.

Provinces—Communicable diseases—Four weeks ended November 22, 1930.—During the four weeks ended November 22, 1930, cases of certain communicable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1			1			2
Chicken pox		2	1				3
Diphtheria		14	1	2	1	2	20
Malaria	1	16	1		9	24	51
Measles		2		3			5
Paratyphoid fever		1		1		2	4
Scarlet fever	10		1				11
Typhoid fever	3	23		21	1	14	62

ITALY

Communicable diseases—Four weeks ended September 7, 1930.—During the four weeks ended September 7, 1930, cases of certain communicable diseases were reported in Italy as follows:

Disease	Aug. 11-17, 1930		Aug. 18-24, 1930		Aug. 25-31, 1930		Sept. 1-7, 1930	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	37	34	51	44	57	50	65	56
Cerebrospinal meningitis	6	6	8	8	8	8	6	6
Chicken pox	37	27	72	44	64	39	74	53
Diphtheria and croup	350	214	422	249	417	241	466	258
Dysentery	113	23	32	16	42	23	19	13
Lethargic encephalitis	1	1	1	1	1	1	4	4
Measles	670	201	573	190	615	197	456	172
Poliomyelitis	9	7	12	12	7	7	15	12
Scarlet fever	272	109	295	131	351	134	353	144
Typhoid fever	1,072	523	1,083	501	1,174	536	1,297	589

MEXICO

Tampico—Communicable diseases—December, 1930.—During the month of December, 1930, certain communicable diseases were reported in Tampico, Mexico, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	3	1	Malaria	173	8
Enteritis, various		26	Tuberculosis		28
Influenza		3	Typhoid fever		3

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		June 29–July 26, 1930	July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct 18, 1930	Week ended— Oct. 25, 1930	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27	January, 1931: 3	10
Afghanistan	C	P	P														
China.																	
Amoy	C			2													
	D			2													
Canton	C	2			1	1											
	D	1															
Shanghai	C			34	38	1		1									
	D			3	4												
Shensi Province	C			P													
Swatow	C		3	2													
Tientsin	C		2	1													
India	C	26,121	42,893	51,551	36,529	5,222	5,689	4,146	3,887								
	D	13,822	22,358	23,959	17,635	2,733	2,915	2,149	1,985								
Bassein	C			1													
Bombay	C		14	1	16	17	1	1		2	2	4	5				
	D		8	2	11	10	6	1		2	1	1	3				
Calcutta	C	220	63	27	24	7	7	11	8	4	6	2	10	9	7		
	D	128	30	12	15	4	2	6	4	4	4	1	7	6	4		
Madras	C		1		2		1							44			
	D		1		2									39			
Rangoon	C	1	1	2	1										1		
	D	1	1	1	1										1		
Tuticorin	C				1				1	4		1		1			
	D				1				1								
India (French):																	
Chandernagor	C	1		1	3				1		1						
	D				1												
Pondicherry	C				1				1	1	1	1	1				
	D				1					1	1	1	1				
India (Portuguese)	C		1	1			3	9	2								
	D			1			3	5	1								

Indo-China (see also table below):																	
Pnompenh	C	32	11		2	1					1	1					
	D	22	6								1	1					
Saigon and Cholon	C	10	5		2	1					1		2	1			
	D	3	1								1						
Philippine Islands: [1]																	
Ports—																	
Cebu	C	65	9	2													
	D	36	8	2													
Iloilo	C	29	64	10	1						1					1	
	D	22	76	14	4						3					1	
Manila	C		1	13	5												
	D			12	1												
Provinces—																	
Antique	C		20	17	40												
	D		12	34	18												
Bohol	C		138	49													
	D		79	20													
Bulacan	C	4	1	1	2												
	D			2	1												
Capiz	C	3	2	1													
	D	2	2														
Cebu	C	713	55	25													
	D	303	70	11													
Iloilo	C	409	571	238	50	10	10	4	6	11	21	13		7	5	13	3
	D	193	376	151	40	7	7	3	6	8	11	8		6	4	10	2
La Union	C	1															
Leyte	C	1															
	D	11															
Masbate	C	2	34														
	D	35	14														
Misamis, Occidental	C	3															
	D	3															
Negros, Occidental	C	568	343	122	28	12	3	19	22	44	28	48	33	23	19	33	40
	D	368	237	91	20	12	3	12	14	33	17	45	28	22	16	26	33
Negros, Oriental	C	23	8														
	D	13	4														
Nueva Ecija	C	1															
	D	1															
Pampanga	C	2		1													
Pangasinan	C	3	1														
	D	2	1														
Rizal	C	1															
	D							1									
Samar	C		18	4	7	6	3	4	3	4	4			2		12	2
	D		16	2	7	5	1	1	2	4	4			1	1	7	1
Sorsogon	C							5									
	D	1						4									

[1] Figures for cholera in the Philippine Islands are subject to correction

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		June 29–July 26, 1930	July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Week ended— Oct. 25, 1930	November, 1930 1	8	15	22	29	December, 1930 6	13	20	27	January, 1931 3	10
Philippine Islands—Continued.																	
Provinces—Continued.																	
Surigao	C		28	1	(1)												
	D		17	2													
Tarlac	C		1														
Siam	C	20	3		4	3		1		2	1	1					
	D	9	2		1	3		1		2	1	1					
Bangkok	C	8	1		3	1	2			2	1		1	2	1		
	D	3	1		2	1	1			2	1		1	2	1		
Songkla	C	10															
	D	6															
On vessel: S. S. Malwa from Shanghai	D			1													

Place		June, 1930	July, 1930	August, 1930	September, 1930 1–10	11–20	21–30	October, 1930 1–10	11–20	21–31	November, 1930 1–10	11–20	21–30	Dec. 1–10, 1930
Indo-China (French) (see also table above):														
Annam [2]	C	16	1	3										
Cambodia [2]	C	144	43	59	23	13	2	16		6		1		28
Cochin-China [2]	C	273	46	27	9	6	18	14	6	8		5		8

[1] During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, P. I.
[2] Reports incomplete.

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		June 29–July 26, 1930	July 27–Aug 23, 1930	Aug. 24–Sept 20, 1930	Sept. 21–Oct 18, 1930	Oct 25, 1932	Week ended November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27	January, 1931: 3	10
Algeria:																	
Algiers	C	3	7	11	6	5	3	1	2			1	1				
	D					3											
Constantine	C	1						1									
Oran	C	3	4	10	10	1			1								
	D			1	3												
Plague-infected rats		2		10	6	1											
Philippeville	C			1	3	1		1									1
Argentina Cordoba Province—Chazon	C												1				
Belgian Congo	C	2	2	5					1				1				
	D	2	2	3					1				1				
British East Africa (see also table below):																	
Tanganyika	C															3	
	D															3	
Uganda	C	228	236	202	165	53	37	34	47								
	D	213	221	191	164	53	36	33	46								
Canary Islands: Las Palmas	D		1														
Ceylon																	
Colombo	C	3	2	2	3				1	1		4	4	4			
	D	3	2	3	3				1	1		3	4	4			
Plague-infected rats		1							1	1	1						
China																	
Manchuria—Tunghau and Nuncan	C		30	29	2												
Shensi	C			P		P											
Dutch East Indies																	
Batavia and West Java	C	84	83	79	107	41	36	27	39	53	56						
	D	84	83	76	103	42	37	28	39	53	56						
Plague-infected rats			1	3													
Java and Madura	D	217	188	260	335	124	140	107	130	137							
Egypt																	
Alexandria	C	23	11	10	9	2	1	1	3		1		2	1	1		
	D	10	6	8	6	3		2	2				1				
Assiout	C	2						3			2		7	5	1		
	D	2						1					1				
Aswan	C										3						
Beni-Suef	C		1														

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		June 29–July 26, 1930	July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Week ended Oct. 25, 1932	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27	January, 1931: 3	10
Egypt—Continued.																	
Gharbieh	C		3														
	D		1														
Girga	C	1		1										3	1	3	
	D														1	1	
Minieh	C	3											1				
Port Said	C	1	1			1	1										
France:																	
Marseille	C			5	4	2	1		1								
St. Ouen	C	1															
	D	1															
Gambia	C		4														
	D		4														
Greece (see also table below):																	
Patras	C	1															
Pyrgos	C				2												
India	C	377	877	2,497	2,371	604	616	558	943								
	D	256	477	1,132	1,068	336	288	317	556								
Bassein	C			2			1										
	D			3													
Bombay	C	1		1	2	1											
	D	1		1	2		1										
Plague-infected rats		52	35	47	64	2	9	11	8	11	5	12	4	10			
Madras Presidency	C	47	81	127	196	69	31	45	40	33							
	D	31	34	57	110	43	22	37	22	24							
Rangoon	C	2	3	10	2		1		1						1	1	
	D	2	2	9	2		1								1		
Plague-infected rats		6	7	8	1	1				1	1			1			
India (Portuguese)	D		P				3										
Indo-China (see also table below):																	
Pnompenh	C	2	4	3	2					1	3	1	1	1			
	D	2			3	1				1	3	1	1	1			
Saigon and Cholon	C		1	1	1												
Iraq: Baghdad	C	18	9		1				P	2	2						
	D	7	3		1					1	1						

Kwang-Chow-Wan	C	4	1														
Madagascar (see also table below): Tamatave	C	1	2	1	1	3		2			2	1	1				
	D				1	3					2		1				
Morocco	C	1	15			4		1						1			
	D		2														
Nigeria: Lagos	C	1	7	6	5	33	1	2	2	4	3	2					
	D	1	7	5	5		1	2	2	4	3	2					
Plague-infected rats		18	8	10	11	3	1	2	7	1	1	1	2				
Peru: Lima [1]																	
Senegal (see table below).																	
Siam	C		7	3	1	3	1	1	1						1		
	D		6	2		3	1		1						1		
Bangkok	C		3						1				1		1		
	D		2						1				1		1		
Nagara Rajsima	C		2	1	1				1				8	4			
	D		2	1	1				1				6	3			
Syria: Beirut	C	9	2	5		1	1	3	1								
Tripolitania	C		2							4	6	2	1				
Tunisia:																	
Sfax district	C	6	1														
Tunis	C	5					1		1				P	12			
	D	1															
Union of Socialist Soviet Republics Salsk region	C	5	7														
	D	4	5														
Union of South Africa:																	
Cape Province	C	1	1	1		1											
	D	1	1	1													
Orange Free State	C			2													
	D			2													

Place		June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930
British East Africa (see also table above):							
Kenya	C	107	97	87	53	73	62
Greece (see also table above)	C	1				2	
Indo-China (see also table above)	C	11	1	2	4		
Madagascar (see also table above).							
Antsirabe Province	C	3	24	11	21		
	D	3	24	11	21		
Miarinarivo Province	C	1	1	2	7		
	D	1	1	2	7		
Moramanga Province	C	3		27	18		
	D	3		27	17		
Tananarive Province	C	16	28	39	79		
	D	16	28	38	79		

Place		June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930
Senegal							
Baol [2]	C	2	62	79	48	53	
	D	2	48	20	23	35	4
Dakar [2]	C	53	140	108	3		
	D	117	122	90	8		
Louga [2]	C	60	138	75	61	37	10
	D	21	103	33	30	25	3
Thies [2]	C	52	54	34	12	24	27
	D	35	30	20	4	15	23
Tivaouane [2]	C	43	119	110	20	53	31
	D	28	70	54	14	31	25

[1] Eight cases of plague were reported at Lima, Peru, during December, 1930 Plague infection is said to exist in interior towns north of Lima.

[2] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		June 29–July 26, 1930	July 27–Aug 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Week ended— Oct. 25, 1930	November, 1930 1	8	15	22	29	December, 1930 6	13	20	27	Jan., 3, 1931
Algeria:																
Algiers	C	1	3											1		
Constantine	C	1						1								
Arabia: Aden	C	1														
Brazil:																
Porto Alegre (alastrim)	C		1	1	26		14	14		20	8					
Rio de Janeiro	C							2								
British East Africa (see also table below):																
Tanganyika	C	168	242	522	95	3	1		13	7	26	18				
	D	42	37	60	6	1					1					
British South Africa: Southern Rhodesia	C	31	1	1	153	2	54	1	33	12						
	D									2						
Canada:																
Alberta	C	5	1	1	22					1						19
British Columbia—Vancouver	C	6	6	2	2		3					1				1
Manitoba	C			1												
Ontario	C	24	20	10	19		20	9		7	12	3				8
Kingston	C														2	4
North Bay	C														1	
Ottawa	C	13	7	5		14		9	14		8	1	1			2
Toronto	C	1		1							2	2				
Quebec	C	3	5							1			1			
Montreal	C		7													
Saskatchewan	C	5	8	1	3		2			2		16				
China:																
Changking	C	P	P	P	P	P	P	P	P	P		P				
Foochow	C	P	P	P	P		P		P							
Hong Kong	C	2													1	
	D	1														
Manchuria—																
Harbin	C	3	2				1									
Kwantung—Dairen	C	8								2		1	1	1		
	D												1			
Nanking	C	P	P	P	P	P	P	P				P	P	P		

Shanghai—																
Foreigners only	C	4	3	18	1	1		1				3	5	4		
Including natives	D			2					1				4	5		
Swatow	D	1	4	2	4	1	1		1	1			2			
Tientsin	C				1			1		1	1					
Chosen (see table below).																
Colombia:																
Barranquilla	C		2													
Buenaventura	C	10	2													
Cali	D				2							1				
Curacao (alastrim)	C	2	1													
Dutch East Indies:																
Borneo	C	2														
Java—																
Batavia and West Java	C	8	12	11	14	2	13	11		2		2				
	D	5	5	4	4	2	1	1		1						
East Java and Madura	C	1														
Sanggi Islands	C	11	36	14		29										
	D	3	2	3		3										
Egypt: Port Said	C	3														
France (see table below).																
Great Britain																
England and Wales	C	529	344	341	325	86	87	92	107	116	160	95	137	138		
Ashton under Lyne	C	8														
Bradford	C	1			3	1	1						1			
Cardiff	C	2				1										
Leeds	C	1				1			2							
London	C	250	178	161	120	29	32	41	47	52	67	27	48	42		
London and Great Towns	C	408	285	168	223	52	58	68	82	88	136	74	112	111		
	D				1		1					1				
Stoke-on-Trent	C	9	2	2	1		1									
Scotland	C	1		5												
	D	1														
Honduras: Naco	C			5												
India	C	7,630	4,877	3,131	2,322	570	459	614	619							
	D	2,348	1,246	680	572	242	104	133	132							
Bombay	C	50	12	6	1							1				
	D	33	10	5								1				
Calcutta	C	73	25	14	12	2	4	3		3	5	6	4	10	19	
	D	56	21	9	11	2	2	3		3	2	4	2	7	13	
Cochin	C	6	14	3	12	3	5	10	7	4	5	6	7	6	7	
	D			1	1	1			2	2		2				
Karachi	C	1	4	4						2	1					
	D		3	2							1					
Madras	C	49	38	34	19	2	1	2	4	3	5	6	6			
	D	12	11	6	8			2				2	1			
Moulmein	C	18	2	1												
	D	1	1	1												
Negapatam	C	4	4	9	14	2	2	2	3	3		1	2			
Rangoon	C		3		2			1			1					
	D							1								
Tuticorin	C				1											
Vizagapatam	C				1											

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		June 29–July 26, 1930	July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Week ended— Oct. 25, 1930	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27	Jan., 1931
India (French):																
Chandernagor	C	4		3	3		3									
	D	3		2	1		1									
Karikal	C	2	9	5	1											
	D	2	9	2	1											
Pondicherry Province	C	27	22	35	38	2	2		7	7	7			8		
	D	25	22	33	36	2	2		7	7	5			7		
India (Portuguese)	C	1	9	4												
	D	1	2													
Indo-China (see also table below):																
Pnompenh	C	1			2						1					
	D	1	1								1					
Saigon and Cholon	C		1	1			2			2	1		1			
	D		3	1			2			1			1			
Iraq:																
Baghdad	C	3	1	1	2											
	D	1	1													
Mossoul Liwa	C	67			61			6		7	9					
	D	20			27					1	1					
Ivory Coast (see table below).																
Mexico (see also table below):																
Jalisco (State) Guadalajara	D	4	1		3	1		1	1	1		2				
Juarez	C		2													
	D		1		1	1										
Mexico City and surrounding territory	C	37	10	12	13	1	3	3	2	1	2		3			
	D	8	6	5	3	1		1					6			
Vera Cruz	C						1									
Morocco (see table below).																
Nicaragua: Porto Cabezas	C													2		
Poland	C					2	3		3	1	2					
Portugal:																
Lisbon	C	13	30	27	16	12			8	11		15	11	21	17	
Oporto	C		1													
Siam	C	6			1											
	D	3														

Somaliland, British: Boales	C				1			1				1				
	D				1											
Spain	C	5	2	3		14	5	11	21	23	21	23				
Straits Settlements	C	11	8	6	5	3	3	4		3	9	1	3	3		
	D	3	3	1	1		1	1		1	2		2	2		
Sudan (Anglo-Egyptian)	C	12	42	128	82	3			2		3		47		47	
	D	1	3	52	7				1				5		5	
Sudan (French) (see table below).																
Switzerland: Berne Canton	C	1	2		1											
Syria (see table below).																
Tunisia: Tunis	C	1			2											
Turkey (see table below).																
Union of South Africa:																
Cape Province	C	P		P	P	P	P	P	P	P						
Orange Free State	C	P	P				1	1	P	P	P					
Transvaal	C		P	P	P	P	P	P	P	P	P					
Upper Volta	C										6					
On vessel:																
S. S. Manoa, from Honolulu to San Francisco	C	1														
S. S. Muncaster, at Manila from Hong Kong	C														1	

Place		June, 1930	July, 1930	August, 1930			September 1930			October, 1930			November, 1930			Dec. 1-10, 1930
				1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30	
Indo-China (see also table above)	C	213	238	59	34		54	52	86	32	62	164		86		38
Ivory Coast	C											4		2		9
Sudan (French)	C	76	34			39		P			17					43
	D	18				3					2					16
Syria: Beirut	C	7	2	1												

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
British East Africa (see also table above):							
Kenya	C	171	142	186		424	
Uganda	C	78					
	D	69					
Chosen	C	107		3	2		
	D	35					
Seishin	C	2	1	2			
	D	1					

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
France	C	51		1			
Mexico: Durango (see also table above)	D	4	3	3	3	2	
Morocco	C	18	5	3	8	4	4
Turkey	C	16					

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		June 29–July 26, 1930	July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27
Algeria:																		
Algiers	C	6	2	3							1			2				
Constantine Department	C	2	3			2			1					1		1		
Oran	C	3	1	1			1	2						3		2		
Bulgaria	C	10	1	4	2		1	3			1	2	1	1	3	6		
	D	1																
China:																		
Manchuria—Harbin (see also table below)	C	2	2	2				1							1			
Shanghai	C		1															
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C	1	1	3	1							2	1	1				
	D			1								2						
Beheira Province	C	15		1													1	
	D	2															1	
Cairo	C		7	2												1	1	
Port Said	C		4	1		1			1	1								
Great Britain. Scotland—Dunfermline	C	1																
Greece (see table below).																		
Ireland:																		
Irish Free State—																		
Galway County—Oughterard	C	2																
Leitrim County—Mohill	C	1																
Mayo County—																		
Ballina	C	1																
Castlebar	C		1															
Westport	C	2	1															
Roscommon County—																		
Roscommon	C	1																
Strokestown	C	1																
Wicklow County—Shillelagh	C	2																
Latvia (see table below).																		
Lithuania (see table below).																		

Mexico:																		
Durango	D			1	1		1											
Mexico City, including municipalities in Federal District	C	5	9	7			3	5	1	1	5	4	1	1		12		
	D		2	2			2		1		3		2	3		2		
San Luis Potosi	D														1	1		
Morocco	C	11	8	2					1		1	1	1				8	
	D							1										
Palestine	C	6	3	3		1	1	1			2	1	1	6			1	1
Poland	C	36	34	23	3	6	6	7	7	8	15	7	12		21	9		
	D	4	3	1	1			1					1		3	3		
Portugal: Oporto	C		1			1		1		2	* 1	1	2	2	2			
Rumania	C	28	9	4	3	4	1	6	4	13	10	14	19					
	D	8	2								1	1	1					
Spain	C	3		1			1	1			4				1			
	D	1		1			1	1							1			
Tunisia	C	24	10	6	1	1	1	9					5		23			
Turkey (see table below).																		
Union of South Africa.																		
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P	P				
Municipality of East London	C	1		2			1					1	1					
Natal	C	1	P	P		P	P	2	P	P	P							
Orange Free State	C	P	P	P														
Transvaal	C	P	P	P	P	P	P	P	P	P	P	P	P	P				
Yugoslavia (see table below).																		

Place		June 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930
China Harbin (see also table above)	C		14	5		3	
Chosen. Seoul	C	2	3	2	1		
Czechoslovakia	C	1		1			16
Greece Athens	C	3	6	6	4	4	4
Latvia	C	3	3	1	2		

Place		June, 1930	July, 1930	Aug., 1930	Sept. 1930	Oct., 1930	Nov., 1930
Lithuania	C	16	18	7	24	1	5
	D			1	2		1
Turkey	C	2	7	2			3
Yugoslavia	C	6					

YELLOW FEVER

	Cases
Brazil:	
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold Coast:	
July 10, 1930	1
Albosso, Aug 4, 1930 (death)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of public health.

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PUBLIC HEALTH REPORTS

VOL. 46 FEBRUARY 6, 1931 NO. 6

THE WORK OF THE UNITED STATES PUBLIC HEALTH SERVICE[1]

Personal well-being is so obviously an individual and personal characteristic that it is frequently a little difficult to convince a citizen living on the Pacific coast that his health is affected by the activities of an agency of the Federal Government 3,000 miles away. In fact, save in times of epidemic, the average citizen is likely to take little interest in the activities of his local health officials, to say nothing of those of the State or Nation. When there is an outbreak of some contagious disease in his community, he becomes intensely interested in methods of preventing the spread of the contagion; but when the outbreak has abated this interest wanes, and that is why there is another outbreak at some later date.

"In time of peace, prepare for war," was the advice of one whom the world generally concedes to have been wise. And it is advice which can be adapted profitably to the work of those charged with the protection of that vital but rather nebulous thing called public health. Preparation for war in the political and military sense does not mean merely storing up supplies of arms and munitions such as were used in the last war. If it did, modern nations would be using clubs instead of tanks, and bows and arrows instead of poison gas and heavy artillery. Preparation for war means constant efforts to improve weapons and constant diligence to prevent the outbreak of hostilities; or, if the latter is impossible, then an effort to so localize the outbreaks as to reduce the enemy's potentialities for damage to a minimum.

It is the duty of public health authorities not only to fight epidemics and diseases while they are actually present but to devise means of preventing epidemics and diseases. This is the reasoning back of the elaborate and far-flung system of disease prevention and control which, in the aggregate, is the United States Public Health Service.

In carrying out its duties the Public Health Service employs more than 5,000 [2] men and women, and expends appropriations aggregating approximately eleven million dollars annually.

[1] This brief summary of the work of the United State Public Health Service is based in part on a series of short copyrighted articles originally published in the United States Daily. By permission, these articles were later printed in Public Health Reports and issued in reprint form (Reprint No. 1128). In the present article the original series has been largely rewritten and brought up to date.

[2] In addition there are approximately 4,500 State and city health officers employed at a nominal salary by the Federal Government to aid in the collection of morbidity reports and in other ways.

The organization now known as the Bureau of Public Health Service had its origin in the Marine Hospital Service, which was established by an act of Congress approved July 16, 1798. This act authorized the President to nominate and appoint medical officers to furnish care to sick and disabled seamen at such ports and other places in the United States as presented needs for services of this nature. It was provided that this care might be given either in hospitals maintained by the United States or in civilian institutions with which contracts might be negotiated.

A tax of 20 cents per month to be collected by collectors of customs from all seamen employed on American vessels engaged in foreign and coastwise trade was the method prescribed by the early legislators for the financing of their first step in safeguarding the public health. It is for this reason that the Public Health Service is a part of the Treasury Department to-day.

The first marine hospital built under the authority of the act of 1798 was at Norfolk, Va., in 1800. In 1802 a hospital was built at Boston, and others followed both along the Atlantic seaboard and along the Mississippi and Ohio Rivers and the Great Lakes.

Necessarily, in caring for sick and disabled seamen in American ports, the medical officers appointed to serve in these early marine hospitals became familiar with the diseases brought into the country from abroad. It frequently happened that these medical officers were the first physicians to diagnose such diseases as cholera, yellow fever, and smallpox, which threatened the welfare of ports of entry. This was particularly true in southern ports, then exposed to frequent dangers from yellow fever.

During epidemics in the early days the Marine Hospital Service frequently received presidential authorization to aid local health authorities in relief and control measures. The marine hospitals and some of the medical personnel as well were used by both the North and South during the Civil War for the care of the military forces.

Gradually, Congress began to extend the functions of the Marine Hospital Service, and to make of that organization a Federal health service. In 1878 the service was given authority to impose quarantine to prevent the entry of disease into the United States from abroad. It was not until 1890 that authority was given to impose quarantines to prevent interstate spread of disease, and then the authority was limited to the prevention of cholera, yellow fever, smallpox, and plague. In 1893, this authority was extended to cover all infectious and contagious diseases, and provision was made for cooperation with State and municipal health agencies to prevent the introduction and interstate spread of such diseases.

Congress recognized the value of military discipline in an organization which had to combat epidemic diseases, and in 1889 authorized

the organization of the Marine Hospital Service along military lines, with officers holding commissions in grades similar to officers of the medical department of the Army.

In 1902 the name of the organization was changed to "The Public Health and Marine Hospital Service," and in 1912 this name was changed to that now borne by the service.

While the public health functions of the service had their inception in the prevention of the introduction and spread of quarantinable diseases, their development was largely the result of changes in public opinion. Investigative functions began with inquiries into the causes of such diseases as yellow fever and cholera. In 1901 Congress authorized the building of the Hygienic Laboratory for the investigation of infectious and contagious diseases, and in 1912 authorization for such research was extended to include all diseases of man and conditions influencing the propagation and spread thereof. This field of work has proved so important and profitable in results that in 1930 Congress increased the facilities for research, provided for the acceptance of unconditional gifts and bequests for the study of the fundamental problems of disease, authorized the appropriation of $750,000 for additional buildings and equipment, and changed the name to the National Institute of Health. To-day this institution is recognized as one of the foremost research centers of the world.

The functions of the Service may be summarized as follows:

1. The protection of the United States from the introduction of disease from without.
2. The medical examination and inspection of all arriving aliens and prospective immigrants.
3. The prevention of interstate spread of disease and the suppression of epidemics.
4. Cooperation with State and local health authorities in public health matters.
5. Investigation of the diseases of man.
6. The supervision and control of biologic products.
7. Public health education and dissemination of health information.
8. The maintenance of marine hospitals and relief stations for the care and treatment of certain beneficiaries prescribed by law.
9. The confinement and treatment of persons addicted to the use of habit-forming narcotic drugs who have committed offenses against the United States and of addicts who voluntarily submit themselves for treatment.
10. The providing of medical service in Federal prisons.

One of the functions exercised by the service—that of supervision and control of biological products—is of tremendous importance. It means that all viruses, vaccines, therapeutic serums, toxins, antitoxins and analogous products applicable to the prevention and cure of diseases of man are tested by the service for purity and potency. The value of such products supervised by the service in one year is well over $10,000,000.

As organized at present, the Surgeon General administers the affairs of the Bureau of the Public Health Service through eight administrative divisions. These are as follows: The division of scientific research, the division of marine hospitals and relief, the division of foreign and insular quarantine, the division of domestic quarantine, the division of sanitary reports and statistics, the division of venereal disease, the division of mental hygiene, and the division of personnel and accounts.

Division of Scientific Research

Save for his superior mental capacity, man enjoys no particular advantage over other forms of life in the struggle against disease. Therefore his most important weapon in that struggle is the application of that mentality to methods of promoting his health. The most effective method of that application devised so far is scientific research through the experimental method.

Granted that the necessity for research exists, the question then presents itself as to whether or not the Government should engage in research. Experience and reason both command an affirmative answer.

While it is true that in the United States as elsewhere a large amount of research connected with the safeguarding of public health is carried on by private agencies, there are, nevertheless, compelling reasons why the Government itself should be represented in this field.

A careful analysis will show that by far the greater part of the research work conducted under private agencies is directed to the solution of problems that are almost entirely local or problems pertaining to curative rather than to preventive medicine. On the other hand, the Government, being interested in the welfare of the entire population, concentrates its efforts upon problems affecting large groups and upon preventive rather than curative methods. Occasionally there is an overlapping, as in the case of syphilis, where to cure one case is to prevent another.

The Government also has a duty to perform in checking up on the results of outside research to determine whether or not much of this information can be recommended for general guidance and in formulating scientific information for administrative purposes. Then, too, there are certain problems which no private agency is equipped to solve. These are problems requiring observations widely distributed in a geographic sense and other problems which can be solved only by concentration of many different research activities working in cooperation and simultaneously. In addition to all of these reasons, there is, of course, the Government's obligation to promote the welfare of the people—an obligation which is not shared by outside private agencies, which, properly enough, have their own ends in view in many of their activities.

Recognizing the necessity and propriety of governmental research in the public health field the Congress in the act of August 14, 1912, provided that:

"The Public Health Service may study and investigate the diseases of man and conditions influencing the propagation and spread thereof, including sanitation and sewerage and the pollution, either directly or indirectly, of the navigable streams and lakes of the United States."

An act of Congress in 1901 established the Hygienic Laboratory in Washington, where an important part of the research activities of the division has been carried on. In 1930 the name of the Hygienic Laboratory was changed to the National Institute of Health, and provisions were made for enlarged facilities, the establishments of fellowships, and the acceptance of gifts for study of the fundamental problems relating to the diseases of man.

The scope of the division's activities may be described as follows:

1. The investigative functions have been extended to include every major topic of public health interest. The approaches to the problems have been from several standpoints—(*a*) of the basic sciences in the laboratory; (*b*) of clinical study; (*c*) of epidemiology; (*d*) of sociology and economics; (*e*) of vital statistics; (*f*) of public health administration.

2. The control function (biologic products), authorized by the act of July 1, 1902, has extended to the limitations of the act in so far as permitted by the funds appropriated. It has included researches necessitated by adequate control. The control of biologic products necessitates inspections in many parts of the United States and in a number of European countries.

The activities of this division have carried its agents into every State in the Union, the insular possessions of the United States, Mexico, and several countries of Europe.

In addition to those activities which it carries on independently the division does not hesitate to cooperate with other agencies doing work within its field. In exchange for opportunities for research and access to material the division always stands ready to cooperate with any Government agency in the solution of problems relating to public health, subject to the consideration of relative importance in terms of service to the country and also subject to limitations of funds and personnel. This same readiness applies to nongovernmental organizations with the additional considerations of their aims, purposes, and good faith.

At various times the division has cooperated in research with many public and private agencies, including the Bureau of Mines, the Bureau of Standards, Johns Hopkins University, Yale, Harvard, the National Research Council, many manufacturing and industrial

organizations, and the State boards of health of the various States of the Union.

A topic is considered eligible for investigation by this division provided it is of public-health interest, and if funds and personnel are available, under the following circumstances:

1. The subject is of widespread significance and no adequate solution is at hand.
2. Other agencies are not studying the subject, or at least not from the standpoint of public health.
3. The subject threatens to become of widespread importance, rendering anticipatory research advantageous.

The principal activities of the division at present include the following:

Studies of a number of diseases of man, including cancer, diphtheria, cerebrospinal meningitis, encephalitis, leprosy, malaria, nutritional diseases, pneumonia, Rocky Mountain spotted fever, smallpox, scarlet fever, trachoma, tuberculosis, tularæmia, typhus fever, and undulant fever; investigations on the subjects of administrative health practice, child hygiene, industrial hygiene and sanitation, milk, morbidity, oxidation reduction, stream pollution; and studies and inspections required for the regulation of interstate traffic in biologic products.

Division of Marine Hospitals and Relief

The marine hospitals were established by Congress in 1798. At that time, the Public Health Service was known as the Marine Hospital Service; the idea of a Federal health department was something entirely outside the ken of political thought in the infant Nation.

From time immemorial it has been the law of the sea that vessels must provide medical attention for seamen. Hence, to encourage the struggling merchant marine, Congress took this means to relieve the ships of this burden.

Thus it came about that some of the earliest institutions established by the Federal Government were marine hospitals, which antedated naval hospitals and, in the early days, took care of officers and men of the Navy. The first marine hospital in Boston, which, incidentally, was the first general hospital in that city, furnished hospital care for wounded who fought under John Paul Jones, as well as for his British prisoners. The present marine hospital in Boston is the third in this port, the first and second having been abandoned in turn as they became obsolete.

The marine hospitals in the beginning were financed through a tax of 20 cents per month, later increased to 40 cents, deducted from the wages of each seaman and collected by the collector of customs. Subsequently this was replaced by a tonnage tax and finally by direct appropriations out of the Treasury. It has been nearly 50 years

since the 40 cents per month tax was collected, but aged sailors still sailing the seas and coming into the hospitals recall that they helped build these institutions out of their own wages.

The earlier hospitals were primitive affairs according to modern standards. Medical knowledge has advanced greatly since 1798, and the marine hospitals have kept abreast of the time. Attending specialists augment the regular staff of medical officers; trained nurses, professional dietitians, and skilled physiotherapy aides are employed. The medical and surgical work of the marine hospitals compares favorably with that of representative hospitals in their respective ports.

There are only 25 marine hospitals, all in the United States, as the policy is to build marine hospitals only where it is less economical to provide hospital care by contract with private hospitals. A building program is under way, and new marine hospitals have recently been completed and occupied at Detroit, Mich., and Cleveland, Ohio. A 500-bed marine hospital is under construction at San Francisco and a 600-bed hospital at New Orleans. This will be the fourth marine hospital in the city of New Orleans, each of the other three having been replaced in turn by a more modern institution. A smaller marine hospital is under construction at Galveston, and funds are available and plans under way for new hospitals in Seattle, Baltimore, and New York City, the latter to be ultimately a 1,000-bed institution.

Approximately 300,000 persons apply annually for treatment at the marine hospitals and out-patient offices, and there are constantly between 3,000 and 4,000 sailors in hospital. During the year ending June 30, 1930, there were furnished 1,547,000 patient hospital days, 871,780 out-patient treatments, and 115,892 physical examinations were made for purposes not related to treatment, including the services rendered to the Civil Service Commission, Pension Bureau, and other Government agencies. There were 1,120 deaths. In the marine hospital laboratories 258,860 bacteriological and other clinical laboratory examinations were made, and 87,605 X-ray exposures were made for diagnostic purposes.

Dental treatment is furnished at all marine hospitals by full-time commissioned dental officers. Most patients entering these hospitals, especially the merchant seamen, are suffering from septic mouth conditions. With the elimination of dental infection by operative or prophylactic measures, some quite remarkable recoveries have been obtained.

The first dental officer was appointed in 1919. Until that time dentistry was not available in marine hospitals. During the last fiscal year 52,763 patients were given 280,722 dental treatments. Included in this number of cases were 312 fractures of the lower jaw.

The marine hospitals are open to personnel of the Army, Navy, and Coast Guard, to patients of the United States Veterans' Bureau, and to injured employees of the United States Government receiving care under the supervision of the Employees' Compensation Commission. The hospital on Ellis Island, New York City, is operated partly for detained sick immigrants. It is also the policy of the Government to allow foreign seamen to enter marine hospitals as pay patients when a request is made on their behalf by the master of a foreign vessel or by a foreign consul.

It costs a little more than $5,000,000 per year to maintain the marine hospitals. Approximately $500,000 a year is returned to the Government for the various classes of pay patients, including immigrants. The average cost of operation is slightly more than $4 per patient per day, which is considerably less than that of civilian hospitals furnishing equivalent services and having trained nurses and salaried staffs of physicians and surgeons.

Starting out merely as an agency doing relief work for seamen, the Public Health Service has expanded and acquired manifold and varied functions. It was natural for quarantine duties to be added, together with other functions relating to the safety of ships and the welfare of their personnel. It became the agency which examines applicants for license as pilots and other ships' officers who must pass satisfactory tests for vision, color vision, and hearing. Lighthouse keepers are also required to pass similar examinations before they are appointed. The Public Health Service must also vouch for the physical ability of sailors qualifying as "able-bodied seamen," of which the crew of an American ship must have not less than 65 per cent; and since ships' officers must be versed in first aid before being licensed by the Steamboat Inspection Service, courses of instruction have been organized in 43 ports where medical officers give the necessary instruction preliminary to examination of the candidates in this subject. All medical service for the Coast Guard is furnished by the Public Health Service, which also sends its medical officers with the cruising cutters on the Alaska seal patrol and the North Atlantic ice patrol, and wherever else these ships may go.

Alcoholic liquors and narcotics required for medicinal use on board any American or foreign ship in an American port are purchased or otherwise authorized by an officer of the Public Health Service in amounts according to the governing medicinal needs.

The marine hospital at Fort Stanton, N. Mex., is for tuberculous beneficiaries suitable for treatment at a moderate altitude, the selection being limited to patients with favorable prognosis. Although climate is regarded as less important now than when this hospital was established in 1899, its value for the purpose is none the less, because the location is fairly central for merchant seamen from the Atlantic,

Pacific, Gulf, and Great Lakes and the hospital is convenient for the prolonged care necessary to complete recovery of selected tuberculous patients. Paid employment is provided for those approaching fitness for discharge and as a means of testing their recovery.

At the marine hospital, Carville, La. (the National Leper Home), there are 325 patients under treatment. Many of these are voluntary patients and others have been culled by State health officers from the population at large. Treatments by chaulmoogra oil, X ray, and mercurochrome, by violet ray and other lights, as well as by hydrotherapy and many other agents, have yielded encouraging results, and some cures have been effected. During the period 1920–1930, 78 patients were discharged to their homes with a clean bill of health and leprosy arrested. Radio, baseball, moving pictures, a library, a school, and religious solace furnished by chaplains and chapels for Catholics and Protestants bring some measure of contentment to the inmates. Leper patients physically fit are employed by the Government at nominal pay in light occupations at this institution, thus providing diversion and funds. All patients are clothed and otherwise well cared for at Federal expense.

From 1919 to 1922 the Public Health Service was designated as the principal agency to care for World War veterans in need of hospital care. To do this the service rented hospital space, converted hotels and other buildings to hospital uses, and, in general, did the best it could to meet an unprecedented situation which confronted it unexpectedly. In 1922, when Congress assigned this work to the Veterans' Bureau, the Public Health Service turned over 57 hospitals with 17,500 beds, 900 physicians, 1,400 nurses, and 9,200 employees. More than a million veterans passed through these hospitals during the time they were under the supervision of the Public Health Service.

The marine hospitals, in addition to their other functions, may be considered as a second line of defense behind the foreign quarantine division in preventing the entry of quarantinable disease into the country. For example, a seaman in New Orleans applied to the marine hospital for treatment. It was found that he was suffering from bubonic plague. The quarantine officer was notified at once and the ship was fumigated to destroy the rats and fleas through which this disease is transmitted. No further cases occurred.

For more than a decade the marine hospitals have replied to radio requests for medical advice received from ships at sea. These messages are transmitted by commercial stations which have been most generous in giving this service without charge. It occasionally happens that medical advice thus given enables the master of the vessel to save a life or alleviate pain, and it frequently enables the ship to continue on its course instead of putting in at some unscheduled port with loss of valuable time and inconvenience to passengers.

Division of Foreign and Insular Quarantine

The right of a community to protect the health of its members by excluding nonresidents afflicted with communicable diseases has been recognized and exercised since the dawn of history. So well established is this right that the principle has never been questioned in any of the countless controversies which have raged over its application to specific cases. Quarantines have been enforced as to individuals, cities, and nations by methods ranging from the religious taboos of the primitive races to the bayonets and warships of the modern and more materialistic peoples.

Geographically, the quarantines of antiquity and, indeed, up to modern times, were comparatively limited. The means by which the great scourge diseases were transmitted were not understood, and in many cases it was thought that so long as physical contact with the diseased persons was avoided the disease would not spread.

Two chief factors have combined to increase the geographic area of quarantines in modern times. The first is the discovery of the means whereby diseases are transmitted, and the second is the development of transportation by sea, land, and air which facilitates the transportation of disease as well as persons and property.

Thus it comes about that all modern civilized nations now recognize the need for national quarantines and national agencies to enforce national quarantine regulations. The United States, due to the peculiar relationship between the individual States and the Federal Government, was one of the last of the great powers to have a national quarantine system in operation. In the early years of the Nation's existence the contention was advanced (and upheld by the courts) that the imposition and enforcement of quarantine regulations was an exercise of the police power reserved to the States.

Quite early in its history the Public Health Service was authorized to advise and cooperate with the State health authorities. Gradually this developed to a point where the various States came to realize the advantages of a national uniform system for foreign quarantines, and one by one the State legislatures voluntarily relinquished that function to national authorities. The Public Health Service now administers the quarantine at all ports of the United States, and this work is done through its division of foreign and insular quarantine.

This division has two major functions—(1) the prevention of the entrance of infectious and contagious human diseases from foreign countries into the United States, and (2) the medical examination of aliens applying for admission to the United States as immigrants. In the exercise of the first-mentioned function the division has jurisdiction over all ships and all persons, both citizens and aliens, coming into American ports from abroad. The second function, of course, has to do with aliens only. In the medical examination of immi-

grants the Public Health Service acts in an advisory capacity to the Immigration Service of the Department of Labor in ports of arrival in the United States and to the consular visa officers of the Department of State abroad.

The responsibility of the Public Health Service ceases with respect to an immigrant when he has been certified to the immigration authorities as either admissible or inadmissible from the standpoint of mental and physical fitness. On the other hand, the Public Health Service is solely responsible for the conduct of the quarantine work at the ports.

There are three lines of defense against the introduction of the quarantinable diseases, cholera, plague, yellow fever, typhus fever, and smallpox. The first line consists of the public health officers stationed abroad and working in cooperation with the consular officers to prevent such diseases in any form from being transported on vessels bound to the United States; the second line is the system of quarantine inspection at the various ports of entry; and the third line is the cooperation between the Public Health Service and local health authorities at ports of entry, particularly with respect to nonquarantinable infectious or contagious disease.

Once a diseased person has entered the United States, the Public Health Service can control only interstate travel of such person. A system of cooperation has been established with city and State health authorities at the ports respecting cases of nonquarantinable diseases.

Methods of preventing the introduction of quarantinable diseases vary with the diseases, as each spreads by different means and must be blocked accordingly. In the case of cholera, where the usual avenue of transmission is from person to person via the alimentary tract, the method is to prevent the entrance of any persons suffering from the disease. The work is complicated by the fact that certain persons are immune from cholera themselves but can carry the germs of the disease and transmit them to others. These persons, known as carriers, are more difficult to guard against than persons actually suffering from the disease, since the former may be entirely unaware of their condition. Cholera carriers are denied admission to the United States until they are noncarriers, and persons who have been exposed are detained long enough to determine whether or not they are infected.

Yellow fever, once the terror of the South, is probably the best example which can be cited of a disease almost entirely wiped out of existence by science. At one time there were periodic outbreaks in every southern State and throughout Central and parts of South America and Africa, but now the disease is found only in a few isolated districts of South America and Africa. The fight against yellow fever was won when it was discovered that the disease was trans-

mitted, in nature, solely through one particular species of mosquito, the *Aëdes ægypti*, generally known as the *Stegomyia*. Once this was ascertained, the problem was reduced to the elimination of this mosquito on ship and its control on shore. The *Aëdes ægypti* mosquito can fly but a short distance and breeds in small collections of fresh water about houses, which make it exceedingly vulnerable to careful control. Since the discovery of the means whereby yellow fever is transmitted, there has been only one outbreak of it in the United States—in 1905.

Plague, another quarantinable disease which claims its victims by the thousands in many parts of the world, is of two varieties—pneumonic and bubonic. The former, while very deadly, has occurred chiefly in Asia, only two small outbreaks having occurred in this country. The bubonic variety is an ever-present danger, for nearly every port in the world. Just as yellow fever was found to be transmitted by the *Aëdes ægypti* mosquito, so it was found that bubonic plague is transmitted through the combined agency of rats and their fleas. The rats themselves are subject to plague; the fleas live on the rats until the latter die and then the fleas attack any warm-blooded animal, including man, and in biting pass the disease along. Fleas, however, specialize, and different animals have their own species that will live on no other animal except in emergencies. Thus, rats have several varieties; and while all of them theoretically can transmit plague, practical observations and experiments now under way indicate that for practical purposes there is only one, or possibly two, species of fleas that need be considered. Periodic fumigation of ships to rid them of rats and fleas is one of the methods employed, but in its search for better methods the Public Health Service has developed the rat proofing of ships, which is an effective method for the control of this danger.

Smallpox has been one of the historic scourges of man for centuries. Since the discovery of vaccination, about 135 years ago, the ravages of this disease have been curtailed to a remarkable degree, and it could be practically eliminated if vaccination were universal; but experience shows that neglect of this preventive measure is sooner or later always followed by a recrudescence of the disease in a community. Smallpox is combated at ports of arrival through the use of the immunity reaction, which indicates whether or not a person can contract the disease. This is effective as a method of determining whether a previous vaccination is still effective. Persons who have not been vaccinated or whose vaccinations are no longer active submit to another vaccination if they have been exposed to smallpox. No coercion is employed to induce persons to submit to vaccination, but if they are not vaccinated they must be detained in quarantine for 14 days.

Typhus fever is transmitted by body lice carrying the infection from an infected person to another. Hence, the method employed in fighting it is to destroy the lice. Just after the World War, when typhus was widespread in Europe, it was estimated that 3,000,000 persons died from it in five years. It was at this time that the trans-Atlantic steamship companies installed their delousing plants on advice of Public Health Service officers stationed abroad, and all persons arriving were bathed and disinfested, if not scrupulously clean. At present less than one-tenth of 1 per cent of the persons arriving at American ports are found to be infested; and it is reported that on account of the requirements of the United States Public Health Service there has been a great improvement in conditions abroad, particularly in places where body lice had long been accepted as a matter of course.

Arriving persons found suffering from diseases in the quarantinable group are cared for in the Public Health Service quarantine station hospitals until danger of transmitting the disease to others is past; then, if they are American citizens, they are released. If they are aliens, they are released to the immigration authorities.

In cooperation with the Department of Labor and the Department of State the Public Health Service, through its division of foreign quarantine, makes the physical examinations for all prospective immigrants. During the fiscal year ending June 30, 1930, officers of the service examined 1,211,796 applicants for admission and 988,759 alien seamen; 156,370 immigrants were examined abroad under a new system inaugurated in 1925, which has eliminated most of the heartaches and suffering of the old system and has excluded the unfit to an extent never before possible.

So far as physical condition is concerned, prospective immigrants are divided into three classes—class A, those having defects which make them mandatorily excludable under the law; class B, those whose defects are not such as to make exclusion mandatory, but which may interfere with the applicant's ability to earn a living; and class C, those having minor defects which do not affect their ability to earn a living but which are noted, nevertheless.

Division of Domestic Quarantine

"Quarantine," by which is meant any forced stoppage of travel, communication, or intercourse on account of contagious or infectious diseases on land or by sea, was probably the earliest known method used to prevent the introduction of disease. Isolation and quarantine, in the sense of holding vessels and people until danger of disease was supposed to have passed, were naturally in use for ages before the actual modes or methods for transmission of communicable disease were known, and during the colonial period each of the colonies

had more or less adequate provision for its protection from the introduction of exotic disease from abroad.

When the United States came into being, with its unique system of balance between Federal and State powers, health matters, which are universally regarded as police powers, were, by inference, left to the control of the several States. The control of foreign and interstate communication, however, was, of course, given to the Federal jurisdiction. Among the early laws passed in the first decade after the Constitution were those enjoining Federal officials (Army, revenue cutter, customs, etc.) to assist the several States in the enforcement of their quarantine laws. There were few or no laws other than local providing for the possibility of the interstate spread of disease. With the introduction of the railroad and steamboat, with consequent increase in travel and communication, the necessity for coordinated effort was seen, and by consent of the States, and under the commerce clause of the Constitution, laws were passed providing for Federal control both of interstate and maritime quarantine functions.

The domestic quarantine division of the Public Health Service came into being in 1910. Its functions may be summarized as follows:

1. Enforcement of the interstate quarantine regulations of the United States.
2. Development of State departments of health, especially divisions of communicable diseases and sanitary engineering.
3. Control over water supplies used for drinking and culinary purposes on railroads, vessels, and other interstate carriers.
4. Sanitation of the national parks in cooperation with the National Park Service.
5. Measures for the control and prevention of trachoma.
6. Studies of and demonstrations in rural sanitation.
7. The annual conference of State and Territorial health authorities with the Public Health Service.
8. Other contacts with State and Territorial health officials relating to health administration.

Some idea of the extent of the duties imposed upon the division by the requirement that it enforce the interstate quarantine regulations may be gleaned from the first paragraph of these regulations, which reads:

"For the purpose of interstate quarantine the following diseases shall be regarded as contagious and infectious diseases within the meaning of section 3 of the act approved February 15, 1893: Plague, cholera, smallpox, typhus fever, yellow fever, typhoid fever, paratyphoid, dysentery, pulmonary tuberculosis, leprosy, scarlet fever, diphtheria, measles, whooping cough, epidemic cerebrospinal meningitis, anterior poliomyelitis, Rocky Mountain spotted or tick fever,

gonorrhea, chancroid, anthrax, influenza, pneumonia, epidemic encephalitis, septic sore throat, rubella, and chicken pox."

And paragraph 2 of the same regulations provides that—

"Any person or thing, either living or dead, which has been unduly exposed to or in intimate contact with or is infected with any of the diseases enumerated in section 1, except as otherwise provided in these regulations, shall be regarded as contagious or infectious until the contrary has been proved, and if found in any car, vessel, vehicle, or conveyance undergoing interstate transportation, shall be subjected to such inspection, disinfection, or other measures as may be necessary to prevent the spread of the infection from them."

It will be appreciated that these regulations impose an undertaking of considerable magnitude upon the division of domestic quarantine. The regulations cover almost every conceivable situation which might arise in connection with the travel of persons suffering from communicable diseases and the travel of things subject to infection. Provision is also made for the sanitation of interstate common carriers and for the supervision of drinking water and food supplies used on such carriers.

One of the activities of the Public Health Service in connection with interstate travel is the sanitary control over all water supplies used for drinking or culinary purposes on interstate carriers. It is obvious that this is a tremendous task. The water included in this description comes from more than 2,800 sources. Control over this supply from a sanitary standpoint is practicable only because of the cooperation given the Public Health Service by the State and city health authorities. There are many indirect results from this function of the Public Health Service. It has been found that when the water supply of a certain city has been adjudged unfit for use on trains in interstate traffic, these cities are usually quick to improve their water supply. The local citizenry is prone to feel, and quite properly, that what is not good enough for the traveler passing through their city is not good enough for the home folks.

Sanitation in the national park reservations is a most important phase of the work of the domestic quarantine division. Tourists from every State in the Union visit these parks each year, and if proper precautions were not taken the parks might easily become national focal points of disease distribution. Disposal of sewage and protection of water supplies are the principal subjects with which the public-health officials have to deal in the national parks.

The suppression of epidemics naturally falls within the jurisdiction of the domestic quarantine division. An outbreak of bubonic plague at Los Angeles, Calif., in recent years was suppressed by an active campaign against rodents combined with extensive rat proofing of buildings and the elimination of rat harborages. Similar steps

against the same disease have been effective at San Francisco, Oakland, Calif.; New Orleans; Pensacola; Galveston and Beaumont, Tex. The ground squirrels of California have been found to be carriers of the disease, and squirrel-free zones have been maintained around certain ports to prevent the infected squirrels from coming in contact with city rats and causing an extensive plague infection—first of the rats, and later of human beings.

It was the division of domestic quarantine which directed the investigation of the shellfish industry following upon an outbreak of typhoid fever attributable to infected oysters. The investigation resulted in the adoption of methods to prevent infection of the oysters through cooperation with the shellfish industry and State health authorities.

Rural sanitation is a subject in the development of which the Public Health Service takes an active interest through studies and demonstration work. The counties have been encouraged to work in this field in the past through allotments from Federal funds. The local communities now spend about $10 for this work for every dollar contributed by the Federal Government. Demonstration projects in which the division is now participating include: General sanitation, child and maternity hygiene, tuberculosis control, acute communicable disease control, and school hygiene.

For the fiscal year ending June 30, 1929, the appropriations for the work of the domestic quarantine division totaled approximately $526,000.

Division of Sanitary Reports and Statistics

It is a fundamental principal that in any warfare the success of the conflict largely depends upon our knowledge of whether there be an enemy, when, where, and in what numbers he may be found; and so in the fight against disease from a public health standpoint, whether it be municipal, State, national, or international, it is of fundamental importance that responsible officials have early, accurate, and complete knowledge as to the presence or absence of the important communicable diseases. In the absence of such knowledge there will be either a lack of vigilance, which may end in disaster, or, what is of vast importance in these days of commercial enterprise and rapid communication, there will be a futile and unnecessary expensive outlay against a supposed danger which does not exist.

This has, within the past few decades, been brought out, particularly in the matter of yellow fever. So long as infectible countries, such as ours, knew of the general existence of yellow fever but did not know the exact endemic centers of this disease, elaborate precautions had to be taken at our maritime quarantine stations against all yellow-fever-suspected areas, whereas, at present, with our intelligence service, such precautions have been waived with benefit to commerce.

The collection and dissemination of information concerning the prevalence of disease is of increasing importance in this age of speedy transportation facilities. For instance, it is possible that a person infected with typhoid fever may, even by motor, traverse the entire width of the country before the completion of the incubation period of this disease.

The division of sanitary reports and statistics of the Public Health Service may well be described as the intelligence office of the Federal health agency, whose intelligence, however, is used throughout the world by other governments, as well as by our own local and State agencies. Broadly speaking, the work of this division has two general phases—first, the collection from all parts of the world, including our own country, of information having a bearing on the maintenance of public health, and, second, the dissemination of this information in such manner and to such persons and organizations as will make it most valuable. Between the collection and dissemination of information there is, of course, the very important work of compilation.

The information employed by the division is secured from many sources, local, State, Federal, and international. To begin with, every consul and consular officer stationed abroad makes a weekly report to the Public Health Service as a part of his routine duties. The reports are made on forms provided by the Public Health Service and bearing a list of the more important communicable diseases. The consular officer obtains reports from health officials of the country to which he is accredited, and from these reports and such other sources as are available he fills in the information required on the form and mails it to the Public Health Service. These reports by mail cover the following diseases: Cerebrospinal meningitis (epidemic); cholera, Asiatic; cholera nostras, cholerine, or gastroenteritis; diphtheria; measles; plague, human; plague, rodent; poliomyelitis (acute anterior poliomyelitis or infantile paralysis); scarlet fever; smallpox; tuberculosis; typhoid fever (enteric fever, typhus abdominalis); typhus fever (typhus exanthematicus); and yellow fever.

In cases where there is an outbreak of plague, cholera, yellow fever, or typhus fever in his territory the consul promptly cables his information, instead of mailing it. Owing to this method of transmitting information it occasionally happens that a ship which has left a foreign port before one of these outbreaks reaches an American port in ignorance of the fact, and the master of the ship gets his information concerning the disease from the American health authorities.

Cholera, plague, yellow fever, typhus, smallpox, leprosy, and anthrax are classified as quarantinable diseases. This means that when a ship reaches port from an area in which there has been an outbreak of one of them, or with a case of one of these diseases on

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board, there are special measures of disinfection and segregation which are taken to prevent any spread of the contagion or infection in the United States.

Reports from consular officials abroad are the principal sources upon which the Public Health Service depends for what may be distinguished as its current information on world health conditions. In addition, however, the service receives all of the bulletins and other documents issued by the health section of the League of Nations, the International Hygiene Office in Paris, and similar agencies. Most of these, of course, are at least a month old when they reach the United States, but they are valuable records for statistical purposes.

The United States has what is called sanitary treaties with all of the important nations of the world (International Sanitary Convention of Paris), as well as a regional agreement with Pan American countries (Pan American Sanitary Code). These sanitary agreements, which have the force of treaties, provide for an international exchange of information relating to public health. This means that all of the nations of Central and South America receive regularly all the data on public health gathered by the world-wide information system of the United States, this information being cabled in case of emergency conditions. This is of immense value to some of the small States which do not have their own facilities for such purposes.

In the domestic field the Public Health Service is kept informed of conditions by weekly reports mailed in from local health officials in 570 cities of 10,000 or more population. These reports cover the prevalence for their respective territories of the following diseases: Chicken pox, diphtheria (carriers not included), influenza, measles, mumps, pneumonia (all forms), scarlet fever, smallpox, tuberculosis (all forms), typhoid fever, whooping cough, cerebrospinal fever, dengue, lethargic encephalitis, pellagra, poliomyelitis (infantile paralysis), rabies (in man) (developed cases), rabies (in animals), typhus fever.

The local officials who send in these reports are classified as "collaborating epidemiologists" of the Public Health Service and are paid $1 a year. Their reports are mailed under Government "frank" upon cards provided for that purpose.

In addition to the reports mailed in each week from the 570 cities, the service also receives weekly telegraphic reports from health officials of the various States.

These reports from city and State officials and from the consular officers abroad constitute the basis of the information contained in PUBLIC HEALTH REPORTS, which is issued weekly by the Public Health Service and sent to nearly 10,000 public-health officials, sanitariums, libraries, and institutions throughout this country and abroad.

The reports, besides tabular statements of domestic and foreign conditions indicating the state of public health, contain special articles on various phases of public health work and summaries of current works on sanitary engineering, as well as abstracts of current court decisions affecting public health work. It may be remarked here that the experience of many years indicates that the courts in nearly every instance apply the tests of common sense and reasonableness to acts of public-health officials which come before the courts for review.

When there has been an outbreak of some particular disease necessitating special measures by the service, in cooperation with city and State health officials, it is the practice to include in the PUBLIC HEALTH REPORTS an account of these activities.

The editing and distribution of PUBLIC HEALTH REPORTS is one of the functions of the division of sanitary reports and statistics.

It may be asked, Of what use is all of this statistical and other information? Some may doubt the value of informing a public-health official in California of an epidemic of influenza in Massachusetts. But it is axiomatic in public-health work that disease can not be prevented unless the health officials know where, when, and under what circumstances communicable diseases occur.

The value of reports of this kind was strikingly demonstrated during the influenza epidemic a few years ago. The epidemic originated, so far as the United States is concerned, in Boston and spread westward across the country. It was found that public health officials in touch with the situation could predict almost to the day when cases of this disease would be reported in the Middle Western and Western States along the line of march of the "flu" bacillus. And to be forewarned of epidemics of this character is more than half the battle of combating them.

The division of sanitary reports and statistics was the first organization to take up the idea of radio broadcasfing of talks on health topics on a large scale. This service was inaugurated in 1921. The talks are prepared by medical officers of the service and leading specialists of the United States and are broadcast from the naval station at Arlington, Va. Multigraphed copies are sent to other broadcasting stations throughout the country, and frequently they are "put on the air" by these stations.

Another function of the division is handling the vast number of requests for literature and information on health topics which pour into the Public Health Service. The service now has nearly 2,000 publications which may be sent in reply to such requests. When a request comes in for information not given in any of these publications, an effort is made to refer the inquirer to sources from which he can obtain what he desires. Frequently inquiries on subjects falling

within the scope of other agencies of the Government are referred to those offices for reply. Likewise it happens quite often that other departments and bureaus receive requests for information which can be supplied by the Public Health Service. A regular system of interchange of such requests has been worked out. In the course of the last fiscal year ending June 30, 1930, a total of approximately 370,000 copies of publications was sent and individual replies made in response to requests for information.

Division of Venereal Diseases

The problem of venereal-disease control has for long occupied the attention of the United States Public Health Service. As far back as 1875 the annual report of the Surgeon General contained a number of recommendations for the prevention of the introduction of syphilis and gonorrhea into the United States and suggestions for the treatment of those already infected which apply equally to the problem of to-day as at that time. However, it was not until the World War brought the country to a state of mind in which it was willing to look these problems squarely in the face that the Government assumed its share of responsibility of informing the public frankly concerning the nature and prevention of venereal disease and the application of medical and other measures of control.

On July 9, 1918, Congress passed the Chamberlain-Kahn Act creating in the Public Health Service a division of venereal diseases, and appropriating more than $4,000,000 for use during the two following fiscal years to carry out duties imposed by this act, which were as follows:

(1) To study and investigate the cause, treatment, and prevention of venereal diseases.

(2) To cooperate with State boards or departments of health for the prevention and control of such diseases within the States, and

(3) To control and prevent the spread of these diseases in interstate traffic.

A tremendous impetus was thus given to venereal-disease control work as a result of the interest of the Public Health Service in this movement. During the first 12 months after the passage of this act every State in the Union except four was prosecuting vigorous measures in accordance with the cooperative plan outlined by the Public Health Service.

In keeping with the necessary and inevitable economical readjustments following the war, which materially affected the amount of Federal appropriations, the appropriation for venereal-disease control activities dwindled to approximately $75,000 per annum. More recently, however, Congress has been more generous, and for the present fiscal year the appropriation is $100,000.

During the fiscal year 1930 there were 44 of the States which made regular reports to the Public Health Service relative to the prevalence of venereal disease and also on the control activities of their States in this field of public health. Practically all States have provided treatment for gonorrhea and syphilis in public clinics where both those who can pay a nominal fee as well as the truly indigent patient can be treated. More than 100,000 new patients are admitted annually to these clinics for treatment. These patients are receiving an average of 18 treatments, or a total of more than one and a half million treatments, annually in the clinics throughout the United States which report to the Public Health Service through their State boards of health.

The fact that the patients average 18 or more treatments is one of real satisfaction to those interested in prevention and control of the disease. Recent studies of treatment of infectious relapse among those patients coming to treatment for early syphilis reveal that the chance for relapse is greatly reduced with the administration of 14 or more injections of an arsenical product. It is obvious that is it in the period of relapse that much of the infection is spread, since the victim is usually unaware of the relighting of his infection.

It is especially encouraging to find that approximately 50,000 patients annually remain under treatment in the public clinic until they are discharged as arrested or cured. However, since there are still twice as many fresh infections coming to the public clinic annually as there are cases discharged as arrested or cured, the venereal-disease problem still remains one of educating the public in regard to the dangers of exposure and in prophylaxis and effectiveness of early and thorough treatment during the period of infectivity. Efforts directed toward this end have resulted in State departments of health maintaining extensive laboratory service for determining the presence of the spirocheta pallida and the gonococcus. During the fiscal year 1930 there were 1,000,000 blood serum tests made for syphilis, 10,000 microscopic tests for the live spirochete in the chancre stage of syphilis, and 350,000 microscopic tests for the gonococcus.

In the field of prevention, work has been done through the medium of lectures, films, exhibits, and slide showing, and the distribution of pamphlets. There are approximately 800,000 pamphlets distributed annually. These pamphlets deal with every phase of the venereal-disease problem from the giving of sex education to the youth and schools of the country, to the results of clinical, field, and laboratory researches into the various aspects of the venereal diseases of material significance to the health authorities, the medical profession, and the public generally. Under the direction of the United States Public Health Service last year there were 28 lectures and films shown relative to venereal disease. This work, which had its beginning largely in the Public Health Service, is being rapidly assimilated by the State

boards of health; in fact, last year the States reported 3,000 lectures and film showings on venereal-disease information.

In order that complete and accurate knowledge as to the extent of the venereal diseases among the general population might be known, the United States Public Health Service, in cooperation with State and county health authorities and the American Social Hygiene Association, took a 1-day census of the number of cases of venereal disease under treatment in selected communities throughout the United States. The estimates based on these data reveal that from the number of persons infected the control of these diseases is of paramount importance to the well-being of the Nation. The communities selected for survey were well distributed geographically. The surveys included reports from physicians, hospitals, clinics, and other institutions administering to the sick, serving approximately 20 per cent of the population of the United States, including communities from the most sparsely populated to the very densely populated cities.

From these data it is estimated that we have approximately 643,000 cases of syphilis and 474,000 cases of gonorrhea constantly under medical care. In order to determine the trend of the infections a resurvey has been undertaken in the originally surveyed communities. The results of these studies are not yet available.

An extensive cooperative study is being made with the Committee on Research in Syphilis, of New York City, to determine the effectiveness of the various methods of treatment in five of the best clinics of the United States and if possible through these findings make a standard form of treatment for the several types of syphilis.

The division of venereal diseases for a number of years has been actively engaged in research studies to determine the relative significance of serological tests; to determine the nature of the reacting substances in the blood stream; to fix as closely as possible the duration of infectivity in persons infected with syphilis in both treated and untreated individuals; and to evaluate the use of biological products in the diagnosis, treatment, and prognosis of gonorrhea.

With the aid of one of the large philanthropic foundations, the Public Health Service is developing a more comprehensive program for the control of syphilis among certain selected rural population groups, which includes not only Wassermann surveys to determine the prevalence of syphilis in large population groups, but also the provision for intensive treatment without cost for all cases where the individuals voluntarily agree to place themselves under medical care. Projects of this character up to the present time have been established in seven counties in various sections of the South and are carried on in cooperation with State and local health authorities. The objects of these studies are to determine the prevalence of syphilis

in the Southern States in as large a cross section of the population as possible, to demonstrate the practicability of mass treatment on a large scale under the conditions existing in rural communities, and to ascertain as far as possible what effect the mass treatment will have on the incidence of syphilis in the future.

As a measure for preventing the interstate spread of the venereal diseases, a free clinic has been maintained by the Public Health Service at Hot Springs, Ark., in cooperation with the National Park Service, since 1920 for the treatment of indigent cases of venereal disease which come to Hot Springs for the free baths. Large numbers of individuals continue to come from many States, and in this way the clinic makes a valuable contribution to the prevention of the interstate spread of syphilis and gonorrhea through the elimination of sources of infection in a group most likely to become a public menace. During the fiscal year ended June 30, 1930, 5,704 cases were handled, 79,180 treatments were administered, and in addition to these treatments, 107,296 baths were given. The annual increase for relief and treatment is approximately 8 per cent. Moreover, as a part of the educational activity of the division of venereal diseases the facilities of this clinic have been made available to physicians who desire to take refresher courses in the diagnosis and treatment of the venereal diseases. These courses are gratis and have served to stimulate the interest of all who have taken them in the problems of venereal-disease control.

Successful efforts have also been made to secure essentially uniform laws throughout the United States concerning the control of venereal diseases. All States now require these diseases to be reported, and control measures are applied in a manner similar to that in which they are applied to other contagions. Under certain conditions cases which continue to spread the disease are quarantined.

Most States have laws forbidding the sale of "quack" remedies for venereal treatment. Uniform laws and ordinances have been adopted governing the control of prostitution and making the transmission of venereal diseases a crime.

Division of Mental Hygiene

Early in the spring of 1928 the late Congressman Stephen G. Porter, chairman of the Committee on Foreign Affairs of the House of Representatives, and former chairman of the American delegation to the Second Opium Convention at Geneva in 1925, introduced a bill in Congress authorizing the establishment of two institutions for the confinement and treatment of persons addicted to the use of habit-forming drugs. After extended hearings and a favorable report, the bill passed the two Houses of Congress and was approved by the President on January 19, 1929.

The act authorizing these two institutions created within the office of the Surgeon General of the Public Health Service an administrative and investigative division then called the narcotics division, which was charged in law with the administration of the two narcotic farms; with studies of the nature of drug addiction and the best methods of treatment and rehabilitation of persons addicted to habit-forming drugs; with the dissemination of information on the best methods of treatment and research; and with cooperation with State and local jurisdictions with a view to developing facilities for the care and treatment of narcotic addicts.

It is, perhaps, common knowledge in the United States that the practice of indulging in habit-forming drugs, like the problem of alcoholism and mental disorders, is not limited to any one class of society; the high, the low, the rich, the poor, the weak, and the strong are all represented. Nor does one occupation possess a monopoly of the practice; for drug addicts are found in most unexpected places, no nationality, race, or color being exempt.

While the act which authorizes the establishment of the two narcotic farms is to make provision first for those drug addicts who have committed offenses against the United States, it also provides for the admission of voluntary cases. The institutions, therefore, will care for what has sometimes been classed as the criminal addict element, and also for those persons addicted to the use of habit-forming drugs that are sometimes classed as the socially adjusted addict.

Persons addicted to the use of opium or its derivatives seek cure from a variety of reasons. The sincerity for giving up the drug vanishes, however, with the approach of withdrawal symptoms. With the subsidence of the withdrawal symptoms, sometimes called the period of "denarcotization," the physical rehabilitation begins. It is during this period that all inhibitions appear to be released, sensual conduct and perversions being the most outstanding reactions. In the development of the two United States narcotic farms for the treatment of these individuals, isolation, artificial barriers, and constant vigilance are fundamental and necessary.

The actual number of drug addicts in the United States is an unknown quantity, because the use of narcotics is usually carried on in secret. Various estimates have been made and much of the popular writings of the day undoubtedly tend to exaggerate the evil effects of the so-called "demon flower." Any estimate greater than 200,000 is a very liberal one, and it is believed to be beyond reasonable probability. The Public Health Service has estimated that there are 110,000 addicts in the United States, or approximately 1 in each 1,100 persons.

One of the greatest precipitating causes of drug addiction is ease of access to the drug and contact with other addicts. In a recent study conducted by the Public Health Service, it was found that among 3,587 drug addicts, 1,694, or a little less than half, attributed their addiction to the influence and contacts of other addicts in the community. Curiosity, thrill, and bravado accounted for 340 more, whereas, self-treatment for the relief of pain accounted for 531 as the cause of addiction. The predisposing or underlying causative factors, however, rest upon the constitution or mental make-up of the individual. These factors are being recognized and appreciated more and more in the treatment and management of drug addiction.

For purposes of general description, the drug addict population may be classified under two broad general headings—namely, the mentally normal, who comprise a small but variable proportion, and the mentally abnormal. The latter may be classified, on the basis of constitution, first, as to intelligence level and, second, as to affective mental make-up. Of the first class, comprising a small proportion of addicts, the intelligence may vary from that of a child 6 or 7 years of age to that of a child 10 or 11 years of age. Of the second class, the intelligence level may be inferior, or seem superior, but the quality of their emotional make-up and mental constitution renders them incapable of adapting themselves in accordance with the standards of conduct established by society. Drug addiction in such individuals is a complication of an established delinquency.

On the other hand there are certain types of individuals who are of the definite neurotic type. These people are, more or less, in constant conflict with themselves, and intemperate and impulsive conduct and inordinate emotional reactions stamp them as unusual, if not odd. These neurotic constitutions are prone to absolve their obligations and responsibilities to themselves and to society, and to adopt a self-exculpatory philosophy toward their real or imaginary difficulties. The habitual use of narcotic drugs affords a temporary refuge for such persons, enabling them to obtain through artificial narcotism a brief respite from the supposed hardships that realities appear to impose. Not all neurotic individuals become addicted to the use of habit-forming drugs, however, for many of them find refuge through other more or less sublime channels. While some of them are inefficient, many of them lead useful lives and contribute no little to the field of art and literature.

On the other hand, various experiences indicate that a drug addict with a normal mental background will not continue as a drug addict, as narcotism is unnecessary for the comfort of one who enjoys that satisfaction which comes from good mental health. Nor will drug addiction produce in such an individual the so-called degeneration

and lack of responsibilities seen in the addicts of the temperamental neurotic or psychopathic constitution.

In the treatment and care of drug addiction, the most obvious need, making first appeal, is institutional care during the period of the so-called withdrawal symptoms. On the other hand, the lack of cooperation on the part of most drug addicts in their treatment; the recourses adopted to obtain a supply of their drugs; their return to the habit; and the perversions and social reactions of drug addicts generally, engender a feeling of abhorrence and lack of interest on the part of the general public and many of the medical profession. It must be conceded, however, that a majority of persons now addicted to the use of habit-forming narcotic drugs are mentally ill. If this be true, then their treatment, segregation, care, and efforts at rehabilitation must be through a mental health approach.

This was recognized by the Congress of the United States, for on June 14, 1930, the name of the narcotics division in the Public Health Service was changed to the division of mental hygiene. All the authority, powers, and functions exercised by the narcotics division were transferred to the division of mental hygiene, and the scope of functions and activities of the newly created division were enlarged. Thus the division of mental hygiene is charged with making studies and investigations of the abusive use of narcotic drugs and the quantities necessary to supply the normal and emergency medical and scientific requirements of the United States. It is also charged with making studies and investigations of the causes, prevalence, and means for the prevention and treatment of mental and nervous diseases. In other words, special provision for the care of the narcotic addict is but a small part of that large and important problem of mental hygiene.

Since 1914 the Public Health Service has been engaged from time to time upon special studies and investigations concerning the relationship of mental and nervous disorders to the public health. Such investigations and studies have embraced the field of clinical psychiatry; administrative experiences in connection with the operation of institutions especially devoted to the care and treatment of mental diseases; administrative and investigative activities with reference to the mental phase of immigration work; and special field studies and investigations in institutions devoted to the care of the dependent, delinquent, and criminal classes. Special field investigations have also been made in communities and political subdivisions of the United States with reference to the prevalence, the needs, and the social situation of the mentally disordered population.

On May 13, 1930, the President approved an act of Congress authorizing that medical relief under the Department of Justice in

Federal penal and correctional institutions shall be supervised and furnished by personnel of the Public Health Service.

Another act of the Seventy-first Congress, second session, approved by the President on May 13, 1930, authorizes the establishment of a hospital for the care and treatment of all persons charged with or convicted of offenses against the United States, who are in actual custody, and during their detention or confinement are or shall become insane, afflicted with an incurable or chronic degenerative disease, or so defective mentally or physically as to require special medical care and treatment not available in existing Federal institutions.

A review of the public documents respecting these two acts again calls attention to the fact that important medical problems arise in connection with the care of Federal prisoners. These may be considered under the headings of routine requirements and of research activities. The routine requirements involve the psychiatric examination and classification of all inmates and physical examinations that will permit of prompt recognition and correction of physical defects and diseases among prisoners.

It is obvious that the Public Health Service is interested in the investigative and the administrative possibilities which the laws provide. Apparently no new precedent has been established by charging the Public Health Service with this new responsibility; for it is merely another step in attempting to coordinate and promote uniformity in the medical work of the Federal Government.

Division of Personnel and Accounts

Every organization which operates over a wide geographic area needs a central control office, a nerve center, so to speak, which directs the movements of the distant members. So the United States Public Health Service, which has the earth and the air above and the waters, if any, underneath the earth, for its sphere of activity, has a dispatcher's office in the guise of its division of personnel and accounts. It is through this division that each of the more than 5,000 men and women who comprise the personnel of the service came into the organization; and it is through this office that these same men and women are moved about in the great game which the Public Health Service plays with disease as its opponent and the world as its chess board.

Being a mobile organization and required to meet public health emergencies, the Public Health Service is organized and conducted under strict disciplinary rules. This necessitates adequate central control and means to attend to the mechanics of movements and other matters affecting personnel. In fact, there must be some specific office charged with the keeping of records of appointments, promo-

tions, discontinuances, leaves of absence, changes of station, and maintenance of discipline in accordance with the laws and regulations on the subject. It is the division of personnel and accounts which does all these things for the Public Health Service. In addition the division looks after the preparation of estimates of appropriations to carry on activities, recommends apportionments of appropriations in conformity with law, makes allotments to conduct the several activities, and maintains records of all finances and expenditures, including an elaborate system of cost accounting for the manifold operations of the Public Health Service.

The addition of new laws relating to accounting and to reclassification and retirement of employees renders these records essential to the proper administration of public health activities. Moreover, the division of personnel and accounts is the property office of the Public Health Service. Every article which the service uses, from a laboratory microscope to a hospital ambulance, must be properly accounted for from the time it is purchased until it is worn out and condemned. It is through this division that all records of property and supplies are maintained and surplus supplies at one station distributed to other stations as may be needed.

If any function of the division is more important than the others it is the recruiting and giving commissioned personnel opportunity for experience in the larger duties they will be called upon later to perform. It is this training and experience that enables officers of the Public Health Service to make investigations of far-reaching importance. By this means, light was thrown on the transmission of yellow fever; the cause of hookworm disease in America was discovered, and tularæmia, a disease peculiar to America, was identified and its method of transmission established. Moreover, through experience, officers are able to engage in highly technical investigations affecting the public health. A candidate for appointment in the regular corps is required to pass a thorough examination before a board of commissioned officers. These examinations are held at intervals in various large cities of the United States for those candidates who, after application, have been invited by the Surgeon General to participate. The examinations consist of oral, written, and laboratory tests necessary to determine the candidate's mental and physical aptitude, as well as professional attainments. The service makes no allowance for the expenses of candidates appearing for examination.

Graduates in medicine, dentistry, public health engineering, or pharmacy may apply for appointment if they are eligible. Those who desire to enter in the grade of assistant surgeon must be between the ages of 23 and 32. Those who have the qualifications for entrance in the grade of passed assistant surgeon must not be over 39 years of age. An average of 80 per cent in all branches is required for ad-

mission to the service. Appointments are made by the President on recommendation of the Surgeon General and subject to confirmation by the Senate. When this confirmation has been given, the candidate is issued a commission in the grade of assistant surgeon or passed assistant surgeon and is assigned to duty.

At this point in the career of the young Public Health Service officer it becomes the duty of the division of personnel and accounts to see to it that he is given such assignments as will provide him with a well-balanced experience, necessary to the solution of larger problems while he remains in the service. So far as practicable, during the first four years he is in the service, the young medical officer is detailed for duty at a marine hospital, a quarantine station, an immigration station, hygienic laboratory, and in public health work in the field, in the order named.

The length of time the officer spends on each detail depends upon his previous training and the exigencies of the service. Where possible and within limits, consideration is given to the preference of the individual officer.

After three years' commissioned service, those in the grade of assistant surgeon are eligible for promotion, after examination, to the grade of passed assistant surgeon, except assistant pharmacists, who are required to serve five years before promotion to this grade, which is the senior grade for pharmacists.

Passed assistant surgeons, after 12 years' commissioned service, may be promoted to the grade of surgeon.

Promotion to the grade of senior surgeon is made after 20 years' service, and to the grade of medical director after 26 years' service.

Before such promotions are made, the officer is required to pass a physical and professional examination, and his record must be found satisfactory on review by a board of commissioned officers.

The pay of comissioned officers of the Public Health Service ranges from $2,699 for the grade of assistant surgeon to $7,179 for a medical director or assistant surgeon general, both without dependents. For officers having dependents, the range is from $3,158 to $7,200.

The Surgeon General receives $9,700 if he has dependents and $9,179 if he has none.

These salaries are established by the same law which fixes those of officers of the Army and Navy. The grades are comparable to those of commissioned officers of the Army and Navy.

All other personnel of the Public Health Service is selected from lists of eligibles established by the Civil Service Commission under civil service law and regulations.

For administrative purposes the Public Health Service divides the country into six sanitary districts with a medical director assigned to each district. Through these directors the Surgeon General

keeps in touch with State and local health authorities, universities, industries, and other interests favorably affected by public health work. These directors also make inspections of service stations and activities with a view to their coordination, investigate administrative difficulties, and devise means for the prevention and suppression of epidemics liable to occur within their districts. The ordinary routine of stations is handled by the officers in charge. The district directors accordingly act largely in an advisory capacity without the necessity of considerable personnel.

The present is an age of specialization, particularly in the field of medicine and sanitation, and thus it happens that within the service there are groups of officers having special qualifications for solving particular problems. Some of these officers may be devoting their time regularly to investigations of communicable diseases, nutritional diseases, the health hazards of industry, or other public health problems. But when an emergency arises in any district, selection and detail of personnel must be made to meet it. In such cases the division of personnel and accounts is the channel through which the Surgeon General transmits his orders. All epidemic situations are met in this manner. These movements of personnel are limited as much as possible, however, by the policy of having officers with all-round training distributed here and there so as to meet emergency situations as they arise.

There are many extra routine demands upon the Public Health Service for the services of specialized personnel. The extension of the immigration inspection work to European, Canadian, Mexican, and Cuban ports, the fight against the spread of bubonic plague in California, the tetraethyl lead investigation, the investigation of the shellfish industry, investigations and administration of methods to safeguard milk supplies, and advisory work with the Office of Indian Affairs are demands which require the selection and disposition of qualified personnel. The act of Congress of May 13, 1930, authorizing the Public Health Service to furnish medical relief in all Federal penal and correctional institutions, imposes new duties on the service which will require additional personnel.

In addition, there are constant demands from private and semipublic organizations for assistance and instruction in public health matters. Officers are detailed, therefore, to attend meetings of associations for the promotion of public health. It is the policy of the service to supply speakers wherever possible and where the importance of the occasion merits, for the dissemination of public health information and to cooperate with and aid State and local authorities in the solution of public health problems which arise in connection with administration. It is necessary for some agency to evaluate for the

Surgeon General the relative importance of the demands received. This decision devolves largely upon the division of personnel and accounts because of its knowledge of the availability of officers from day to day.

COURT DECISION RELATING TO PUBLIC HEALTH

City ordinance, making unlawful the slaughter of animals in certain territory without permission from common council, upheld.—(New York Supreme Court, Appellate Division; City of Albany *v.* Newhof et al., 246 N. Y. S. 100; decided Nov. 26, 1930.) An ordinance of the City of Albany provided that "It shall not be lawful for any person without permission from the common council to slaughter cattle, sheep, or swine in any building now erected or hereafter to be erected, or otherwise, within the territory hereinafter described." In the trial court the city had judgment restraining the defendants from slaughtering cattle on their premises in Albany, the city having alleged that defendants were unlawfully so doing without the city council's consent. The defendants questioned the validity of the ordinance, but as to this the appellate division stated that the ordinance was "a legislative act of the common council, authorized both by legislature and constitution," and was "not inconsistent with the constitution or any State law." The ordinance was valid, the court held, even though the city council acting in its legislative capacity placed the dispensing power in itself. "Nor," said the court, "is there discrimination in that consent to slaughter cattle within a restricted district depends upon the act of the common council as an administrative body." The appellate division affirmed the trial court's judgment, but said that "the plaintiff should be restrained from enforcing its judgment until defendants have had a reasonable opportunity to apply for consent to continue their business."

DEATHS DURING WEEK ENDING JANUARY 17, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended January 17, 1931, and corresponding week of 1930. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce.)

	Week ended January 17, 1931	Corresponding week, 1930
Policies in force	75, 092, 689	75, 374, 773
Number of death claims	17, 116	15, 936
Death claims per 1,000 policies in force, annual rate	11. 9	11. 0

Deaths[1] from all causes in certain large cities of the United States during the week ended January 17, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Jan. 17, 1931				Corresponding week, 1930		Death rate[2] for the first 3 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1931	1930
Total (81 cities)	9,579	14.0	791	[4] 62	12.8	726	13.8	13.0
Akron	40	8.1	4	39	8.8	10	8.0	8.3
Albany [5]	37	14.9	2	40	18.0	3	14.4	15.6
Atlanta	82	15.4	9	92	17.1	13	17.3	16.7
White	42		5	79		3		
Colored	40	(6)	4	115	(6)	10	(6)	(6)
Baltimore [5]	222	14.2	19	64	13.8	16	15.3	15.1
White	164		11	48		10		
Colored	58	(6)	8	125	(6)	6	(6)	(6)
Birmingham	70	13.6	10	101	16.3	3	15.0	14.5
White	33		2	34		2		
Colored	37	(6)	8	195	(6)	1	(6)	(6)
Boston	250	16.6	20	57	14.2	30	16.7	16.2
Bridgeport	34	12.1	4	66	13.1	6	13.7	14.4
Buffalo	167	15.0	13	53	11.9	19	14.0	14.3
Cambridge	25	11.4	5	101	12.8	3	14.2	13.1
Camden	33	14.5	2	35	13.6	1	17.7	14.3
Canton	29	14.2	5	114	11.9	3	10.7	11.7
Chicago [5]	715	10.8	72	64	11.7	54	11.2	11.5
Cincinnati	168	19.2	14	84	14.8	3	18.4	16.4
Cleveland	204	11.7	13	38	11.4	28	11.3	11.9
Columbus	77	13.6	4	39	15.6	5	14.3	14.7
Dallas	69	13.2	6		14.9	8	13.2	13.4
White	55		4			5		
Colored	14	(6)	2		(6)	3	(6)	(6)
Dayton	57	14.4	8	112	9.5	2	14.4	9.5
Denver	99	17.7	5	48	16.1	5	17.0	14.7
Des Moines	39	14.1	1	18	19.7	4	13.3	15.1
Detroit	278	8.8	43	69	9.6	32	8.6	9.7
Duluth	27	13.8	2	49	10.3	2	13.2	11.5
El Paso	35	17.4	5		21.8	5	23.8	23.3
Erie	28	12.4	1	19	10.8	3	10.5	10.5
Fall River [5,7]	35	15.8	5	113	13.1	2	13.4	12.4
Flint	27	8.6	5	64	9.2	6	8.3	8.7
Fort Worth	40	12.5	2		11.1	5	13.3	11.8
White	35		2			3		
Colored	5	(6)	0		(6)	2	(6)	(6)
Grand Rapids	34	10.3	2	30	9.6	4	8.8	10.7
Houston	78	13.1	4		8.8	3	12.8	12.1
White	62		4			2		
Colored	16	(6)	0		(6)	1	(6)	(6)
Indianapolis	114	16.1	9	74	13.1	10	15.4	15.7
White	96		9	85		7		
Colored	18	(6)	0	0	(6)	3	(6)	(6)
Jersey City	72	11.8	9	80	11.7	4	12.0	12.7
Kansas City, Kans	37	15.7	5	103	12.8	6	14.8	12.1
White	27		3	74		5		
Colored	10	(6)	2	254	(6)	1	(6)	(6)
Kansas City, Mo	121	15.4	8	61	13.9	10	15.1	13.2
Knoxville	32	15.3	6	128	13.7	1	14.2	12.6
White	25		5	119		1		
Colored	7	(6)	1	204	(6)	0	(6)	(6)
Long Beach	33	11.3	1	24	15.6	5	11.9	12.3
Los Angeles	341	13.5	22	64	14.1	19	14.0	13.4
Louisville	97	16.4	7	60	19.3	8	18.5	14.9
White	72		6	59		6		
Colored	25	(6)	1	66	(6)	2	(6)	(6)
Lowell [7]	23	11.9	4	102	11.4	2	13.6	11.0
Lynn	30	15.2	1	26	14.3	5	13.7	11.4
Memphis	79	15.9	2	21	15.2	4	18.5	15.5
White	37		0	0		1		
Colored	42	(6)	2	58	(6)	3	(6)	(6)
Miami	31	14.4	3	76	13.2	3	13.9	12.1
White	27		2	71		3		
Colored	4	(6)	1	88	(6)	0	(6)	(6)
Milwaukee	114	10.1	9	39	9.3	12	9.5	10.5

See footnotes at end of table.

Deaths [1] ***from all causes in certain large cities of the United States during the week ended January 17, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930*—Continued**

City	Week ended Jan. 17, 1931				Corresponding week, 1930		Death rate [2] for the first 3 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Minneapolis	105	11.6	14	90	13.2	7	12.9	13.1
Nashville	54	18.1	2	30	13.5	4	17.2	16.7
White	35		1	20		3		
Colored	19	(6)	1	59	(6)	1	(6)	(6)
New Bedford [7]	27	12.5	2	53	13.9	1	14.0	13.1
New Haven	32	10.3	1	19	14.4	2	12.2	14.3
New Orleans	188	21.0	12	66	19.0	12	21.9	20.1
White	118		4	33		7		
Colored	70	(6)	8	130	(6)	5	(6)	(6)
New York	2,134	15.7	162	68	11.4	147	14.1	11.8
Bronx Borough	291	11.4	19	43	7.7	19	9.9	8.0
Brooklyn Borough	747	14.8	57	60	10.6	50	13.2	10.9
Manhattan Borough	833	23.9	64	100	17.4	55	21.6	17.9
Queens Borough	222	10.0	18	49	7.2	19	9.1	7.9
Richmond Borough	41	13.1	4	72	14.4	4	14.0	13.5
Newark, N. J.	115	13.5	8	42	11.8	11	13.4	14.3
Oakland	73	13.0	2	26	15.3	5	14.6	13.7
Oklahoma City	45	11.9	6	83	9.2	7	11.7	8.6
Omaha	65	15.6	6	67	12.4	1	16.3	14.3
Paterson	46	17.3	4	69	10.2	2	13.6	12.9
Philadelphia	622	16.5	43	62	12.8	30	15.1	13.2
Pittsburgh	216	16.7	24	83	12.9	22	16.7	13.8
Portland, Oreg.	81	13.8	4	49	15.2	3	14.3	14.3
Providence	68	13.9	11	101	15.0	5	14.7	16.0
Richmond	57	16.1	7	102	15.1	6	15.8	15.6
White	29		2	44		1		
Colored	28	(6)	5	217	(6)	5	(6)	(6)
Rochester	73	11.5	9	82	11.3	5	13.1	11.6
St. Louis	259	16.3	23	77	13.7	12	16.4	14.6
St. Paul	58	11.0	4	41	12.2	2	11.3	11.9
Salt Lake City [5]	39	14.2	4	60	14.1	5	15.7	13.0
San Antonio	78	16.9	16		20.8	6	15.8	19.7
San Diego	44	14.7	5	101	16.7	1	17.0	18.4
San Francisco	207	16.6	5	33	16.4	9	15.3	14.6
Schenectady	15	8.1	1	29	7.6	0	8.0	10.7
Seattle	117	16.4	5	47	11.9	3	14.0	10.8
Somerville	18	8.9	0	0	15.5	5	10.9	11.5
South Bend	12	5.8	1	25	8.4	1	6.9	10.3
Spokane	39	17.5	5	130	14.9	0	14.5	13.5
Springfield, Mass.	28	9.6	0	0	15.8	1	12.2	13.5
Syracuse	50	12.2	5	59	15.6	5	13.1	14.1
Tacoma	30	14.5	2	51	10.7	1	16.0	10.9
Toledo	64	11.3	3	28	13.8	4	11.7	13.6
Trenton	30	12.6	1	17	19.4	2	21.1	17.9
Utica	40	20.4	3	78	22.5	3	16.6	17.4
Washington, D. C.	167	17.7	8	44	15.6	12	18.1	16.1
White	104		5	41		9		
Colored	63	(6)	3	52	(6)	3	(6)	(6)
Waterbury	13	6.7	1	30	12.0	4	9.1	10.6
Wilmington, Del. [7]	21	10.3	6	129	15.2	2	14.7	14.2
Worcester	64	16.9	1	14	10.9	5	14.5	13.4
Yonkers	31	11.6	4	105	11.5	2	10.3	9.1
Youngstown	31	9.3	0	0	10.4	4	11.7	9.6

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 76 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended January 24, 1931, and January 25, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended January 24, 1931, and January 25, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan. 24, 1931	Week ended Jan. 25, 1930	Week ended Jan. 24, 1931	Week ended Jan 25, 1930	Week ended Jan. 24, 1931	Week ended Jan. 25, 1930	Week ended Jan. 24, 1931	Week ended Jan 25, 1930
New England States:								
Maine	5	4	17	1	20	3	0	0
New Hampshire	3	3		9	25	23	0	0
Vermont	2	1			8	18	0	0
Massachusetts	61	133	114	14	643	216	4	3
Rhode Island	8	12	1			2	1	0
Connecticut	15	32	140	21	286	23	4	0
Middle Atlantic States:								
New York	126	141	[1] 1,140	[1] 34	329	407	20	15
New Jersey	58	114	744	8	388	221	4	3
Pennsylvania	127	217			1,022	690	8	11
East North Central States:								
Ohio	39	34	7	8	140	673	5	3
Indiana	64	26	33		251	49	12	23
Illinois	162	218	263	64	905	432	6	11
Michigan	48	83	2	3	143	295	6	31
Wisconsin	24	24	82	76	172	815	1	6
West North Central States:								
Minnesota	8	16	1		28	136	1	0
Iowa	8	11			3	295	2	5
Missouri	39	33	71	19	1,109	43	5	14
North Dakota	5	1		9	3	17	0	7
South Dakota	26	7	1		12	21	0	1
Nebraska	8	5	87	17	30	365	1	6
Kansas	28	20	12	16	53	266	2	2
South Atlantic States:								
Delaware	4	8	1		3		0	0
Maryland [2]	25	27	1,226	24	229	14	0	1
District of Columbia	11	20	28	8	25	3	1	0
Virginia							3	
West Virginia	13	19	150	44	30	100	0	0
North Carolina	33	42	177	39	163	18	8	12
South Carolina	16	12	1,968	1,036	27		0	6
Georgia [3]	33	14	267	156	108	116	2	0
Florida	11	10	42	6	63	12	1	0
East South Central States:								
Kentucky	16		14		76	72	7	0
Tennessee	15	8	187	158	110	64	2	14
Alabama	60	52	87	185	458	21	5	8
Mississippi	14	11					1	4

[1] New York City only. [2] Week ended Friday. [3] Typhus fever, 1931: 2 cases in Georgia.

***Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended January 24, 1931, and January 25, 1930*—Continued**

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan. 24, 1931	Week ended Jan. 25, 1930	Week ended Jan. 24, 1931	Week ended Jan. 25, 1930	Week ended Jan. 24, 1931	Week ended Jan. 25, 1930	Week ended Jan. 24, 1931	Week ended Jan. 25, 1930
West South Central States:								
Arkansas	14	10	209	171	9	3	3	7
Louisiana	21	35	91	27	2	58	1	2
Oklahoma [4]	26	22	155	187	74	96	0	4
Texas	32	35	102	160	141	94	2	1
Mountain States:								
Montana	4	3			2	32	0	1
Idaho						86	1	1
Wyoming	1	3		8	2	7	3	1
Colorado	9	3		1	29	40	0	3
New Mexico	4	6	1	5	21	90	0	3
Arizona	14	9	22	52	125	1	9	13
Utah [2]	3	4	1	2	2	98	1	8
Pacific States								
Washington	25	13			62	123	2	4
Oregon	5	13	56	69	115	21	0	1
California	62	82	93	48	546	628	6	10

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Jan. 24, 1931	Week ended Jan. 25, 1930	Week ended Jan. 24, 1931	Week ended Jan. 25, 1930	Week ended Jan. 24, 1931	Week ended Jan. 25, 1930	Week ended Jan. 24, 1931	Week ended Jan. 25, 1930
New England States:								
Maine	4	0	36	92	0	0	2	4
New Hampshire	0	0	5	25	0	0	0	0
Vermont	0	0	2	15	0	5	1	0
Massachusetts	3	1	325	349	6	0	0	12
Rhode Island	1	0	65	25	0	0	1	0
Connecticut	0	0	74	138	0	0	1	0
Middle Atlantic States:								
New York	0	3	739	519	1	16	6	15
New Jersey	0	0	252	233	0	0	1	4
Pennsylvania	2	0	580	504	2	5	1	18
East North Central States:								
Ohio	1	1	563	205	73	271	8	7
Indiana	1	0	391	217	108	254	0	1
Illinois	4	0	521	517	51	116	7	8
Michigan	1	1	381	284	88	64	4	6
Wisconsin	0	0	145	186	4	77	0	0
West North Central States:								
Minnesota	2	1	4	136	12	7	3	3
Iowa	1	0	89	87	46	150	2	2
Missouri	2	0	178	91	24	26	5	0
North Dakota	2	1	27	31	10	52	0	0
South Dakota	1	0	6	8	38	55	2	1
Nebraska	3	3	51	90	28	71	5	0
Kansas	0	0	68	123	87	46	1	4
South Atlantic States:								
Delaware	0	0	33	17	0	0	0	0
Maryland [2]	1	0	82	75	0	0	3	9
District of Columbia	0	0	32	20	0	0	1	1
Virginia	2	1						
West Virginia	0	0	57	30	19	0	12	3
North Carolina	1	1	58	54	0	33	1	2
South Carolina	1	3	17	26	0	1	4	5
Georgia [3]	0	0	68	30	0	0	7	2
Florida	0	0	7	12	0	1	2	5
East South Central States:								
Kentucky	0	0	114	46	16	16	9	5
Tennessee	0	0	42	17	5	11	3	10
Alabama	3	2	62	51	6	4	14	11
Mississippi	0	0	25	19	12	0	2	2

[2] Week ended Friday.
[3] Typhus fever, 1931: 2 cases in Georgia.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended January 24, 1931, and January 25, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Jan. 24, 1931	Week ended Jan. 25, 1930	Week ended Jan. 24, 1931	Week ended Jan. 25, 1930	Week ended Jan. 24, 1931	Week ended Jan. 25, 1930	Week ended Jan. 24, 1931	Week ended Jan. 25, 1930
West South Central States:								
Arkansas	1	0	35	33	42	20	8	2
Louisiana	1	0	28	22	10	6	2	9
Oklahoma [4]	0	0	29	39	92	100	10	8
Texas	0	0	65	47	31	55	7	1
Mountain States:								
Montana	0	0	59	39	2	6	2	1
Idaho	1	0	20	16	2	11	0	5
Wyoming	1	0	50	16	2	3	0	0
Colorado	0	0	45	24	19	26	1	3
New Mexico	0	0	7	11	2	2	0	0
Arizona	0	0	4	16	14	26	1	1
Utah [2]	0	0	6	9	1	1	1	3
Pacific States.								
Washington	1	1	50	87	36	93	2	2
Oregon	1	0	14	54	19	26	0	0
California	7	1	142	348	82	101	6	3

[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa. [2] Week ending Friday.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
November, 1930										
Arizona	3	26	7	1	202	2	8	11	2	4
Florida	0	76	11	27	36	1	0	32	1	4
December, 1930										
Arkansas	1	52	186	57	6	83	2	62	17	70
California	38	305	306	2	1,052	6	76	487	257	52
Idaho	13	8	1				2	63	0	1
Illinois	39	684	89	17	1,152		25	1,591	109	90
Indiana	20	203	26		543		2	776	242	24
Louisiana	9	134	85	32	8	20	3	72	38	81
Maryland	2	166	74	1	107	2	1	392	0	40
Michigan	31	302	18	2	299	1	14	1,121	149	58
Minnesota	4	78	3		49		22	285	50	6
Missouri	16	212	49	4	2,625		3	530	41	34
New York	49	547			746		18	2,275	27	81
North Carolina	8	337	82		241	86	4	318	5	15
Ohio	14	324	75	1	317		30	2,234	271	95
Oregon		34	87		159		3	47	57	2
Pennsylvania	26	597			1,911	1	8	2,004	0	96
Rhode Island	1	55			6		0	160	0	1
South Carolina		319	2,358	640	9	139	2	83	5	50
Texas	1	264	183	417		2	13	188	0	34
West Virginia	3	89	175		88	1	3	214	54	58

November, 1930

	Cases
Chicken pox:	
Arizona	26
Florida	23
Dysentery:	
Arizona	2
Florida	5
Lethargic encephalitis:	
Florida	2
Mumps:	
Arizona	9
Florida	13
Trachoma:	
Arizona	13
Typhus fever:	
Florida	2
Whooping cough:	
Arizona	34
Florida	16

December, 1930

	Cases
Anthrax:	
New York	2
Pennsylvania	2
Chicken pox:	
Arkansas	109
California	1,566
Illinois	1,811
Indiana	578
Louisiana	27
Maryland	725
Michigan	1,938
Minnesota	687
Missouri	413
New York	3,179
North Carolina	843
Ohio	2,914
Oregon	165
Pennsylvania	4,685
Rhode Island	159
South Carolina	202
West Virginia	206
Diarrhea:	
Maryland	10
South Carolina	291
Diarrhea and enteritis:	
Ohio (under 2 years)	15
Dysentery:	
California (amebic)	10
California (bacillary)	15
Illinois	7
Louisiana	4
Maryland	3
New York	20
Ohio	1
Pennsylvania	2
Food poisoning:	
California	1
Ohio	3
German measles:	
California	32
Illinois	18
Maryland	26
New York	153
North Carolina	135
Ohio	24
Pennsylvania	77
Rhode Island	2
Granuloma, coccidioidal:	
California	1
Hookworm disease:	
Arkansas	2
California	1
Louisiana	40
South Carolina	55
Impetigo contagiosa:	
Maryland	6
Oregon	12
Jaundice, epidemic:	
Maryland	21
Lead poisoning:	
Illinois	3
Ohio	5
Pennsylvania	1
Leprosy:	
California	3
Louisiana	1
Pennsylvania	1

	Cases
Lethargic encephalitis:	
California	1
Illinois	6
Louisiana	1
Michigan	2
New York	3
Ohio	5
Oregon	2
Pennsylvania	7
South Carolina	1
Mumps:	
Arkansas	26
California	779
Illinois	1,154
Indiana	46
Louisiana	5
Maryland	76
Michigan	289
Missouri	63
New York	921
Ohio	445
Oregon	316
Pennsylvania	1,040
Rhode Island	12
South Carolina	70
Ophthalmia neonatorum:	
California	1
Illinois	7
Maryland	2
New York	6
Ohio	64
Pennsylvania	23
Rhode Island	2
South Carolina	13
Paratyphoid fever:	
California	1
Illinois	1
Louisiana	1
Minnesota	1
New York	4
South Carolina	2
Puerperal septicemia	
Illinois	6
New York	10
Ohio	7
Pennsylvania	21
Rabies in animals:	
California	108
Louisiana	8
Maryland	1
Missouri	4
New York	9
Oregon	1
Rhode Island	1
South Carolina	11
Scabies:	
Maryland	6
Oregon	15
Septic sore throat:	
Illinois	5
Indiana	2
Maryland	13
Michigan	32
Missouri	13
New York	34
North Carolina	3
Ohio	85
Oregon	3
Rhode Island	1

	Cases
Tetanus:	
California	6
Illinois	14
Louisiana	4
Maryland	1
Missouri	1
New York	5
Ohio	2
Pennsylvania	1
Trachoma:	
Arkansas	4
California	19
Illinois	9
Missouri	153
New York	3
Ohio	6
Oregon	1
Trichinosis:	
California	2
Illinois	1
Pennsylvania	10
Tularaemia:	
Illinois	89
Indiana	5
Louisiana	2
Maryland	6
Missouri	4
New York	2
North Carolina	3
Ohio	61
South Carolina	1
Typhus fever:	
California	1
Maryland	2
New York	3

	Cases
Typhus fever—Continued.	
North Carolina	8
South Carolina	4
Undulant fever:	
California	7
Illinois	4
Louisiana	8
Maryland	1
Michigan	1
Minnesota	9
Missouri	4
New York	21
Ohio	9
Oregon	2
Vincent's angina:	
Maryland	10
New York [1]	82
Oregon	6
Whooping cough:	
Arkansas	14
California	442
Illinois	511
Indiana	70
Louisiana	41
Maryland	57
Michigan	562
Minnesota	102
Missouri	72
New York	1,769
North Carolina	208
Ohio	327
Oregon	53
Pennsylvania	731
Rhode Island	39
South Carolina	81
West Virginia	101

[1] Exclusive of New York City.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 98 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,480,000. The estimated population of the 91 cities reporting deaths is more than 31,935,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended January 17, 1931, and January 18, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,331	1,632	----------
98 cities	473	679	1,004
Measles:			
45 States	5,959	6,220	----------
98 cities	2,080	1,282	----------
Meningococcus meningitis:			
45 States	144	240	----------
98 cities	68	106	----------
Poliomyelitis:			
46 States	69	21	----------
Scarlet fever:			
46 States	5,265	4,782	----------
98 cities	2,026	1,718	1,434
Smallpox:			
46 States	1,875	1,895	----------
98 cities	103	203	52
Typhoid fever:			
46 States	150	164	----------
98 cities	29	34	32

Weeks ended January 17, 1931, and January 18, 1930—Continued

	1931	1930	Estimated expectancy
Deaths reported			
Influenza and pneumonia:			
91 cities	1,559	1,021	
Smallpox:			
91 cities	1	0	
Omaha, Nebr	1	0	

City reports for week ended January 17, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	19	1	0		0	0	6	5
New Hampshire:								
Concord	0	0	0		0	0	0	2
Nashua	0	0	0		0	0	0	0
Vermont.								
Barre	4	0	0		0	1	0	0
Massachusetts.								
Boston	81	36	17	3	1	38	7	40
Fall River	9	5	3	1	1	1	3	2
Springfield	16	5	4		0	5	7	2
Worcester	19	5	4	5	0	2	2	2
Rhode Island:								
Pawtucket	9	2	0		0	1	0	1
Providence	8	10	5		0	0	0	6
Connecticut:								
Bridgeport	1	6	0	4	2	1	3	3
Hartford	6	7	1		0	55	1	0
New Haven	17	1	4	30	0	25	30	3
MIDDLE ATLANTIC								
New York:								
Buffalo	21	13	14		0	21	37	23
New York	232	208	79	1,005	109	146	36	457
Rochester	12	8	6	1	0	2	3	2
Syracuse	38	4	0		0	7	0	6
New Jersey:								
Camden	3	6	3	1	1	45	3	3
Newark	72	22	7	172	1	5	12	22
Trenton	4	3	2		0	0	3	3
Pennsylvania:								
Philadelphia	231	71	11	40	18	65	30	117
Pittsburgh	71	22	4	2	3	24	18	61
Reading	10	2	0		0	39	53	2
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	5	11	1		3	19	15	24
Cleveland	157	32	15	5	2	5	106	20
Columbus	23	5	4		0	4	3	9
Toledo	63	10	8		0	2	33	3

City reports for week ended January 17, 1931—**Continued**

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Indiana.								
Fort Wayne	2	5	3	----------	0	25	0	5
Indianapolis	37	10	6	----------	1	14	8	17
South Bend	1	1	0	----------	1	0	0	2
Terre Haute	1	1	0	----------	1	0	0	2
Illinois:								
Chicago	98	116	86	10	4	37	56	70
Springfield	0	1	0	1	0	8	0	6
Michigan:								
Detroit	177	60	28	----------	1	11	29	38
Flint	22	4	6	----------	0	6	2	4
Grand Rapids	11	1	0	----------	0	0	0	2
Wisconsin:								
Kenosha	26	2	0	----------	0	0	23	0
Madison	73	0	4	----------	----------	0	37	----------
Milwaukee	119	18	5	3	2	15	254	10
Racine	36	2	3	----------	0	0	1	0
Superior	3	1	0	----------	0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	9	0	0	----------	0	0	0	2
Minneapolis	33	22	7	----------	1	5	80	15
St. Paul	51	8	1	----------	2	0	4	8
Iowa:								
Davenport	1	1	0	----------	----------	2	0	----------
Des Moines	0	2	1	----------	----------	0	2	----------
Sioux City	11	1	4	----------	----------	1	6	----------
Waterloo	12	0	0	----------	----------	1	0	----------
Missouri:								
Kansas City	36	7	10	----------	1	3	0	20
St. Joseph	0	1	1	----------	0	0	0	2
St. Louis	35	43	14	1	----------	942	14	----------
North Dakota:								
Fargo	9	0	0	----------	0	0	3	0
Grand Forks	0	0	0	----------	----------	0	2	----------
South Dakota:								
Sioux Falls	0	0	0	----------	----------	0	0	----------
Nebraska:								
Omaha	16	5	3		0	1	4	5
Kansas:								
Topeka	14	3	2	2	2	1	0	8
Wichita	12	3	1	----------	0	2	0	12
SOUTH ATLANTIC								
Delaware:								
Wilmington	6	2	0	----------	0	1	2	5
Maryland:								
Baltimore	171	25	7	65	3	128	37	38
Cumberland	0	1	0	----------	0	1	0	2
Frederick	0	0	0	----------	0	0	0	0
District of Columbia:								
Washington	29	18	10	10	2	17	0	20
Virginia:								
Lynchburg	8	1	0	----------	1	0	1	6
Norfolk	12	3	1	32	0	0	1	8
Richmond	1	6	5	2	4	39	1	3
Roanoke	7	2	0	----------	3	0	0	6
West Virginia:								
Charleston	5	1	0	----------	0	0	1	3
Wheeling	9	1	0	----------	0	1	0	2
North Carolina:								
Raleigh	10	1	1	----------	1	1	0	3
Wilmington	0	1	0	----------	0	0	0	1
Winston-Salem	16	1	0	2	1	0	2	4
South Carolina:								
Charleston	2	1	1	121	2	7	1	9
Columbia	15	1	1	----------	0	2	7	12
Greenville	1	0	0	----------	0	0	1	0

City reports for week ended January 17, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
SOUTH ATLANTIC—continued								
Georgia:								
Atlanta	0	5	7	39	1	45	0	6
Brunswick	2	0	0		0	0	0	0
Savannah	1	2	1	12	2	0	2	1
Florida:								
Miami	11	2	3		0	0	1	3
St. Petersburg		0			0			0
Tampa	6	1	2		1	11	0	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	1	1		0	1	0	1
Tennessee								
Memphis	52	5	2		6	2	9	11
Nashville	4	3	0		1	1	0	12
Alabama:								
Birmingham	8	3	5	20	1	167	3	9
Mobile	2	1	2		2	0	0	3
Montgomery	13	1	2	1		0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	1			0	0	
Little Rock	7	1	2	1		0	0	2
Louisiana								
New Orleans	7	13	10	18	19	0	0	22
Shreveport	3	2	0		0	1	0	3
Oklahoma								
Muskogee	0	1	0		0	0	0	4
Oklahoma City	1	2	3		0	3	0	9
Tulsa	12	3	1			5	0	
Texas								
Dallas	14	9	4		1	1	7	7
Fort Worth	1	5	9		1	1	0	7
Galveston	1	1	7		0	0	0	1
Houston	14	8	7		1	0	0	16
San Antonio	2	3	1		2	0	1	15
MOUNTAIN								
Montana:								
Billings	0	0	0		0	0	0	1
Great Falls	1	0	0		0	0	0	1
Helena	1	0	0		0	0	0	0
Missoula	0	0	0		0	0	0	0
Idaho:								
Boise	1	0	0		0	0	0	0
Colorado:								
Denver	57	9	6		4	25	14	16
Pueblo	7	2	0		0	17	1	5
New Mexico:								
Albuquerque	6	0	2		1	1	0	1
Arizona:								
Phoenix	0	0	0		0	1	0	1
Utah:								
Salt Lake City	8	4	0		0	1	7	6
Nevada:								
Reno	0	0	0		0	0	0	2
PACIFIC								
Washington:								
Seattle	25	4	1			2	33	
Spokane	16	2	0			4	0	
Tacoma	10	3	2		0	2	1	3
Oregon:								
Portland	18	11	1	1	0	4	12	7
Salem	0	0	0		0	16	0	0
California:								
Los Angeles	52	41	13	38	2	20	14	36
Sacramento	7	2	3		0	0	4	7
San Francisco	50	16	5	5	2	0	6	8

City reports for week ended January 17, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases, reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases, reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases, reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	4	3	0	0	0	1	1	0	0	30	32
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	8
Nashua	0	2	0	0	0	0	0	0	0	0	--------
Vermont:											
Barre	0	1	0	0	0	1	0	0	0	5	2
Massachusetts:											
Boston	81	101	0	0	0	13	0	0	0	23	250
Fall River	3	12	0	0	0	1	1	0	0	4	35
Springfield	9	11	0	0	0	0	0	0	0	2	27
Worcester	12	33	0	0	0	3	0	0	0	2	64
Rhode Island:											
Pawtucket	2	22	0	0	0	0	0	0	0	0	20
Providence	12	19	0	0	0	2	1	0	0	9	68
Connecticut:											
Bridgeport	10	6	0	0	0	1	0	0	0	0	34
Hartford	7	9	0	0	0	1	0	0	0	3	39
New Haven	7	7	0	0	0	2	0	0	0	13	32
MIDDLE ATLANTIC											
New York:											
Buffalo	27	23	0	1	0	5	0	0	0	13	159
New York	228	266	0	0	0	119	7	4	0	186	2134
Rochester	9	89	0	0	0	0	0	0	0	12	69
Syracuse	13	18	0	0	0	1	1	0	0	13	50
New Jersey:											
Camden	7	8	0	0	0	2	1	0	0	2	33
Newark	33	29	0	0	0	7	0	0	0	36	117
Trenton	5	16	0	0	0	1	0	0	0	3	30
Pennsylvania:											
Philadelphia	99	134	1	0	0	35	3	0	0	31	622
Pittsburgh	36	43	0	0	0	10	0	0	0	12	216
Reading	4	5	0	0	0	0	0	0	0	0	25
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	20	36	1	0	0	7	0	0	0	1	168
Cleveland	45	94	0	0	0	16	1	2	0	29	204
Columbus	10	16	1	0	0	6	0	0	0	0	77
Toledo	13	17	0	0	0	5	0	0	0	9	64
Indiana:											
Fort Wayne	6	1	1	0	0	0	0	0	0	0	30
Indianapolis	10	64	4	8	0	3	0	0	0	17	--------
South Bend	4	3	1	0	0	0	0	0	0	5	12
Terre Haute	3	2	0	0	0	0	0	0	0	0	25
Illinois:											
Chicago	133	243	1	2	0	51	2	1	0	56	715
Springfield	2	9	0	0	0	0	0	0	0	0	26
Michigan:											
Detroit	106	134	2	2	0	13	0	0	0	86	278
Flint	13	13	1	0	0	2	0	0	0	10	27
Grand Rapids	12	23	0	4	0	2	0		0	5	34
Wisconsin:											
Kenosha	2	1	1	0	0	1	0	0	0	0	6
Madison	5	2	0	0	--------	--------	0	0	--------	6	--------
Milwaukee	35	10	1	0	0	4	1	0	0	41	114
Racine	5	6	0	0	0	0	0	0	0	13	13
Superior	3	1	0	0	0	0	0	0	0	0	13
WEST NORTH CENTRAL											
Minnesota:											
Duluth	11	0	0	0	0	2	0	0	0	7	27
Minneapolis	53	6	2	0	0	1	1	2	0	18	105
St. Paul	32	7	1	0	0	1	0	0	0	7	--------
Iowa:											
Davenport	1	6	0	17	--------	--------	0	0	--------	0	--------
Des Moines	10	5	2	20	--------	--------	0	0	--------	0	39
Sioux City	2	23	0	0	--------	--------	0	0	--------	1	--------
Waterloo	2	0	1	0	--------	--------	0	0	--------	3	--------
Missouri:											
Kansas City	18	11	0	2	0	8	0	0	0	8	121
St. Joseph	2	4	1	0	0	0	0	0	0	0	25
St. Louis	39	100	1	0	0	12	1	0	0	11	280

City reports for week ended January 17, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases, reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases, reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases, reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
WEST NORTH CENTRAL—continued											
North Dakota:											
Fargo	3	0	0	0	0	0	0	0	0	0	
Grand Forks	0	1	0	0			0	0		0	
South Dakota:											
Sioux Falls	2	1	1	15			0	0		0	6
Nebraska:											
Omaha	5	13	2	31	1	1	0	0	0	0	65
Kansas:											
Topeka	3	1	1	0	0	0	0	0	0	0	21
Wichita	7	3	0	18	0	0	0	0	0	2	33
SOUTH ATLANTIC											
Delaware:											
Wilmington	6	8	0	0	0	0	0	0	0	2	21
Maryland:											
Baltimore	35	56	0	0	0	12	1	3	0	23	222
Cumberland	1	4	0	0	0	0	0	0	0	0	8
Frederick	0	2	0	0	0	0	0	0	0	0	3
District of Columbia:											
Washington	26	26	1	0	0	10	0	0	0	3	165
Virginia:											
Lynchburg	1	0	0	0	0	1	0	0	0	0	19
Norfolk	3	4	0	0	0	0	0	0	0	13	
Richmond	6	12	0	0	0	5	0	0	0	1	56
Roanoke	3	4	0	0	0	0	1	0	0	0	[illegible]4
West Virginia:											
Charleston	1	0	0	0	0	2	0	0	0	0	[illegible]2
Wheeling	2	7	0	0	0	0	1	0	0	0	6
North Carolina:											
Raleigh	1	1	1	0	0	0	0	0	0	13	13
Wilmington	1	0	0	0	0	0	0	0	0	0	8
Winston-Salem	2	3	1	0	0	1	0	0	0	2	
South Carolina:											
Charleston	1	2	0	0	0	0	0	0	0	0	33
Columbia	0	0	0	0	0	3	0	0	0	0	45
Greenville	0	1	0	1	0	0	0	0	0	0	
Georgia:											
Atlanta	5	29	2	0	0	5	0	0	0	2	82
Brunswick	0	0	0	0	0	0	0	0	0	0	8
Savannah	1	0	0	0	0	0	0	2	0	0	[illegible]8
Florida:											
Miami	3	3	0	0	0	0	1	0	0	0	31
St. Petersburg	0		0		0	2	0		0		16
Tampa	1	0	0	0	0	1	1	0	0	0	29
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	19	0	0	0	1	0	0	0	0	[illegible]0
Tennessee:											
Memphis	7	36	1	3	0	4	1	6	1	3	79
Nashville	2	8	0	0	0	3	0	2	0	1	54
Alabama:											
Birmingham	4	13	1	0	0	5	0	1	0	2	70
Mobile	1	3	0	0	0	1	0	0	0	0	20
Montgomery	1	1	0	0			0	0		0	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	2	0	0			0	0		1	
Little Rock	1	1	0	0	0	1	0	0	0	0	
Louisiana:											
New Orleans	8	19	0	2	0	13	3	0	0	1	188
Shreveport	1	1	1	0	0	1	0	1	0	0	29
Oklahoma:											
Muskogee	1	0	2	0	0	0	0	0	0	0	15
Oklahoma City	8	8	1	1	0	5	1	0	0	0	45
Tulsa	2	8	1	4			0	0		2	

City reports for week ended January 17, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases, reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases, reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases, reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL—continued											
Texas:											
Dallas	6	11	1	0	0	7	1	2	1	5	69
Fort Worth	2	7	1	0	0	5	0	0	0	0	40
Galveston	1	0	0	0	0	0	0	0	0	0	14
Houston	2	1	2	6	0	3	0	1	0	0	78
San Antonio	1	3	0	0	0	5	0	0	0	0	78
MOUNTAIN											
Montana:											
Billings	2	1	0	2	0	0	0	0	0	1	6
Great Falls	3	5	0	1	0	1	0	0	0	5	11
Helena	1	0	0	4	0	0	0	0	0	0	2
Missoula	1	0	0	0	0	0	0	0	0	0	5
Idaho:											
Boise	1	0	0	2	0	0	0	0	0	1	8
Colorado:											
Denver	12	28	1	0	0	8	0	0	0	12	96
Pueblo	1	0	0	0	0	0	0	0	0	0	21
New Mexico:											
Albuquerque	1	1	0	0	0	3	0	0	0	0	12
Arizona:											
Pheonix	0	1	1	1	0	2	0	0	0	1	--------
Utah:											
Salt Lake City	5	4	1	0	0	2	0	1	0	15	39
Nevada:											
Reno	1	0	0	0	0	0	0	0	0	0	6
PACIFIC											
Washington:											
Seattle	9	13	2	0	--------	--------	0	1	--------	26	--------
Spokane	10	2	4	0	--------	--------	0	0	--------	0	--------
Tacoma	3	3	4	5	0	0	0	0	0	6	30
Oregon:											
Portland	7	5	9	9	0	3	0	0	0	0	81
Salem	0	0	1	0	0	0	0	0	0	0	--------
California:											
Los Angeles	40	13	3	3	0	24	1	0	0	14	341
Sacramento	2	3	0	1	0	0	0	0	0	3	31
San Francisco	19	3	2	6	0	9	1	0	0	16	205

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Massachusetts:									
Boston	0	0	0	0	0	0	0	4	0
Worcester	0	0	1	1	0	0	0	0	0
Rhode Island:									
Providence	1	1	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
Buffalo	1	1	0	0	0	0	0	0	0
New York	12	4	1	1	0	0	1	3	0
New Jersey:									
Newark	3	1	0	0	0	0	0	0	0
Trenton	0	1	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	2	1	0	0	0	0	0	0	0
Pittsburgh	2	1	0	0	0	0	0	0	0

City reports for week ended January 17, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	2	2	0	0	0	0	0	1	0
Cleveland	2	0	1	1	0	0	0	1	0
Columbus	0	0	1	1	1	1	0	0	0
Indiana:									
Indianapolis	3	0	0	0	0	0	0	0	0
South Bend	1	0	0	0	0	0	0	0	0
Illinois:									
Chicago	10	7	0	0	0	0	1	3	2
Michigan.									
Detroit [1]	2	1	0	0	0	0	0	0	0
Wisconsin:									
Milwaukee	0	1	0	0	0	0	0	2	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	2	0	0	0	0	0	0	2	0
Missouri:									
Kansas City	1	0	0	0	0	0	0	0	0
St. Louis	1	0	0	0	0	0	0	0	0
Nebraska:									
Omaha	2	2	0	0	0	0	0	0	0
SOUTH ATLANTIC [2]									
North Carolina.									
Raleigh	0	0	0	0	1	0	0	0	0
South Carolina:									
Charleston [3]	0	0	0	0	1	1	0	0	0
Columbia	1	1	0	0	0	0	0	0	0
Georgia:									
Atlanta [2]	2	2	0	0	1	1	0	0	0
Savannah	0	0	0	0	1	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	0	2	0	0	1	0	0	0	0
Alabama:									
Birmingham	3	1	0	0	0	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	5	1	0	0	1	1	0	0	0
Oklahoma.									
Muskogee	0	0	0	0	4	0	0	0	0
Texas:									
Dallas	0	0	0	0	1	1	0	0	0
MOUNTAIN									
Colorado:									
Denver	1	1	0	0	0	0	0	0	0
New Mexico:									
Albuquerque	2	1	0	0	0	0	0	0	0
Arizona:									
Phoenix	5	4	0	0	0	0	0	0	0
Utah:									
Salt Lake	3	1	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Seattle	1	0	0	0	0	0	0	0	0
California:									
Los Angeles	4	3	0	0	0	0	1	1	1
Sacramento	0	1	0	0	0	0	0	0	0
San Francisco	1	1	0	0	0	0	0	3	1

[1] Rabies (in man): 1 case and 1 death at Detroit, Mich.
[2] Typhus fever: 4 cases; 1 case at Baltimore, Md.; and 3 cases at Atlanta, Ga.
[3] Dengue; 3 cases at Charleston, S. C.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended January 17, 1931, compared with those for a like period ended January 18, 1930. The population figures used in computing the rates previous to 1931 are approximate estimates. Those used in computing the rates for the weeks ended January 3 and January 4, and subsequent weeks, are estimated midyear populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities December 14, 1930, to January 17, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929-30 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Dec. 20, 1930	Dec. 21, 1929	Dec. 27, 1930	Dec. 28, 1929	Jan. 3, 1931	Jan. 4, 1930	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930
98 cities	[2] 97	128	[3] 73	120	[4] 78	113	[5] 81	114	74	108
New England	131	168	69	126	[6] 119	141	76	162	91	133
Middle Atlantic	65	106	49	113	66	81	62	107	56	89
East North Central	117	167	103	167	89	153	97	130	95	126
West North Central	87	110	53	67	82	116	98	126	82	110
South Atlantic	99	107	79	79	61	94	[7] 94	90	69	112
East South Central	94	123	94	109	70	102	116	72	70	60
West South Central	[2] 219	225	153	171	132	181	142	153	108	192
Mountain	17	61	[3] 67	35	[8] 85	53	[9] 27	70	52	53
Pacific	97	56	47	82	53	99	[10] 59	73	47	81

MEASLES CASE RATES

98 cities	[2] 198	109	[3] 185	91	[4] 270	126	[5] 341	171	324	203
New England	248	92	279	90	[6] 171	129	469	116	310	172
Middle Atlantic	91	59	74	51	98	72	177	109	158	117
East North Central	28	94	28	97	54	117	63	152	87	150
West North Central	1,387	210	1,250	146	1,871	283	2,156	310	1,829	372
South Atlantic	126	39	114	30	318	144	[7] 323	128	500	182
East South Central	310	0	364	0	896	6	861	12	995	36
West South Central	[2] 20	133	26	88	24	91	20	293	7	373
Mountain	163	139	[3] 258	78	[8] 441	203	[9] 222	150	374	247
Pacific	7	418	19	326	24	201	[10] 31	443	65	579

SCARLET FEVER CASE RATES

98 cities	[2] 239	249	[3] 227	216	[4] 224	242	[5] 277	204	316	272
New England	321	310	323	299	[6] 315	391	414	411	539	397
Middle Atlantic	219	176	200	165	224	175	240	218	282	212
East North Central	309	355	288	311	255	341	363	350	398	394
West North Central	273	235	241	179	235	254	296	221	321	265
South Atlantic	190	253	163	144	259	202	[7] 311	218	304	216
East South Central	223	48	385	75	291	114	396	96	465	90
West South Central	[2] 80	99	64	122	105	80	68	129	129	125
Mountain	292	583	[3] 404	322	[8] 85	388	[9] 328	493	331	344
Pacific	97	244	99	246	71	225	[10] 64	241	72	237

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1931, 1930, and 1929, respectively.
[2] Shreveport, La., not included.
[3] Salt Lake City, Utah, not included.
[4] Hartford, Conn., and Denver, Colo., not included.
[5] Baltimore, Md., Helena, Mont., and Spokane, Wash., not included.
[6] Hartford, Conn., not included.
[7] Baltimore, Md., not included.
[8] Denver, Colo., not included.
[9] Helena, Mont., not included.
[10] Spokane, Wash., not included.

***Summary of weekly reports from cities December 14, 1930, to January 17, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929–30*—Continued**

SMALLPOX CASE RATES

	Week ended—									
	Dec 20, 1930	Dec. 21, 1929	Dec. 27, 1930	Dec. 28, 1929	Jan. 3, 1931	Jan. 4, 1930	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930
98 cities	[2] 9	23	[3] 7	18	[4] 7	19	[5] 12	30	16	32
New England	0	0	0	0	[6] 0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	6	31	3	20	5	16	15	27	10	36
West North Central	47	60	42	58	46	81	63	91	98	124
South Atlantic	0	0	0	2	0	2	[7] 3	0	0	6
East South Central	0	7	0	7	0	0	6	6	17	0
West South Central	[2] 16	34	19	27	17	14	37	66	27	38
Mountain	112	52	[3] 45	44	[8] 17	53	[9] 9	44	78	53
Pacific	12	113	24	77	10	89	[10] 12	146	29	123

TYPHOID FEVER CASE RATES

	Dec 20, 1930	Dec. 21, 1929	Dec. 27, 1930	Dec. 28, 1929	Jan. 3, 1931	Jan. 4, 1930	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930
98 cities	[2] 9	5	[3] 7	4	[4] 5	3	[5] 4	3	5	5
New England	9	0	2	2	[6] 2	2	5	0	0	5
Middle Atlantic	3	4	3	3	4	1	2	3	2	3
East North Central	9	3	13	1	4	2	2	2	2	2
West North Central	8	8	6	2	2	0	0	2	4	12
South Atlantic	11	4	15	9	4	6	[7] 14	10	10	6
East South Central	40	0	20	34	47	6	12	6	52	12
West South Central	[2] 28	38	0	8	3	0	20	3	14	7
Mountain	9	17	[3] 11	0	[8] 34	9	[9] 18	0	9	62
Pacific	7	2	7	10	6	8	[10] 2	4	2	4

INFLUENZA DEATH RATES

	Dec 20, 1930	Dec. 21, 1929	Dec. 27, 1930	Dec. 28, 1929	Jan. 3, 1931	Jan. 4, 1930	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930
91 cities	[2] 10	19	[3] 12	19	[11] 15	16	[12] 24	18	36	19
New England	2	9	2	9	[6] 7	7	5	0	10	10
Middle Atlantic	5	18	11	13	[13] 11	9	28	13	59	14
East North Central	10	14	8	13	7	15	12	12	9	17
West North Central	15	15	9	15	3	27	21	30	18	27
South Atlantic	18	13	22	26	20	20	[7] 26	34	41	24
East South Central	37	52	22	30	25	26	44	58	63	39
West South Central	[2] 25	66	34	94	90	71	76	57	79	60
Mountain	17	26	[3] 0	26	[8] 34	18	[9] 44	44	35	26
Pacific	12	28	21	19	10	10	22	12	10	12

PNEUMONIA DEATH RATES

	Dec 20, 1930	Dec. 21, 1929	Dec. 27, 1930	Dec. 28, 1929	Jan. 3, 1931	Jan. 4, 1930	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930
91 cities	[2] 114	158	[3] 130	143	[11] 150	165	[12] 183	160	219	151
New England	106	157	109	94	[6] 154	169	108	176	159	126
Middle Atlantic	133	165	132	155	[13] 167	170	231	181	311	159
East North Central	70	117	95	116	101	114	110	121	124	108
West North Central	95	180	115	174	177	197	200	153	212	209
South Atlantic	126	184	159	152	227	240	[7] 248	192	237	186
East South Central	125	216	184	194	202	227	265	123	227	142
West South Central	[2] 147	234	203	234	186	295	238	189	228	221
Mountain	215	235	[3] 235	209	[8] 254	185	[9] 249	229	270	256
Pacific	156	138	166	104	130	92	134	120	118	137

[2] Shreveport, La., not included.
[3] Salt Lake City, Utah, not included.
[4] Hartford, Conn., and Denver, Colo., not included.
[5] Baltimore, Md., Helena, Mont., and Spokane, Wash., not included.
[6] Hartford, Conn., not included.
[7] Baltimore, Md., not included.
[8] Denver, Colo., not included.
[9] Helena, Mont., not included.
[10] Spokane, Wash., not included.
[11] Hartford, Conn., New York City, N. Y., and Denver, Colo., not included.
[12] Baltimore, Md., and Helena, Mont., not included.
[13] New York City, N. Y., not included.

FOREIGN AND INSULAR

PLAGUE ON STEAMSHIP

On January 21, 1931, the Dutch steamship *Buitenzorg* arrived at Winthrop, Mass., with a history of plague in a member of the crew. The patient joined the ship at Surabaya. Three days later he became ill, and on December 1 he was taken ashore at Batavia where a diagnosis of bubonic plague was made.

CANADA

Provinces—Communicable diseases—Week ended January 17, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended January 17, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Smallpox	Typhoid fever
Prince Edward Island [1]				
Nova Scotia	1	9		
New Brunswick				1
Quebec				11
Ontario	1		10	1
Manitoba				3
Saskatchewan			7	
Alberta				1
British Columbia		2		1
Total	2	11	17	18

[1] No case of any disease included in the table was reported during the week

Ontario Province—Communicable diseases—Four weeks ended December 27, 1930.—During the four weeks ended December 27, 1930, and the corresponding period of the year 1929, certain communicable diseases were reported in the Province of Ontario, Canada, as follows:

Disease	4 weeks, 1929		4 weeks, 1930	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis	4	2	2	5
Chicken pox	1,550		1,196	
Diphtheria	267	13	355	14
Dysentery			1	1
Erysipelas			1	
German measles	73		28	
Gonorrhea	141		172	
Influenza	6	9	14	4
Lethargic encephalitis	1			
Measles	384		83	
Mumps	113		448	
Paratyphoid fever	1			
Pneumonia		148		126
Poliomyelitis	6	1	9	
Scarlet fever	585	7	612	1
Septic sore throat	2		296	5
Smallpox	55		[1] 4	
Syphilis	159		143	
Tetanus	2	2		
Tuberculosis	71	30	136	29
Typhoid fever	22		50	2
Undulant fever			2	
Whooping cough	283	2	338	4

[1] The cases of smallpox were distributed as follows: Toronto, 2; Ottawa, 1; and Sudbury, 1.

Quebec Province—Communicable diseases—Week ended January 17, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended January 17, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	145	Mumps	20
Diphtheria	51	Scarlet fever	81
Erysipelas	4	Tuberculosis	64
German measles	1	Typhoid fever	10
Measles	45	Whooping cough	57

CZECHOSLOVAKIA

Communicable diseases—November, 1930.—During the month of November, 1930, certain communicable diseases were reported in the Republic of Czechoslovakia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	2		Puerperal fever	38	15
Cerebrospinal meningitis	11	4	Rabies	1	1
Diphtheria	2,796	174	Scarlet fever	2,063	44
Dysentery	47	5	Trachoma	249	
Malaria	3		Typhoid fever	582	51
Paratyphoid fever	22		Typhus fever	10	

ITALY

Communicable diseases—Four weeks ended November 2, 1930.—During the four weeks ended November 2, 1930, cases of certain communicable diseases were reported in Italy as follows:

Disease	Oct. 6-12, 1930		Oct. 13-19, 1930		Oct. 20-26, 1930		Oct. 27-Nov. 2, 1930	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	45	37	32	31	40	34	30	29
Cerebrospinal meningitis	10	8	12	10	4	3	6	6
Chicken pox	67	40	96	49	84	48	110	67
Diphtheria and croup	829	367	756	379	770	359	868	401
Dysentery	15	9	14	9	6	6	15	9
Lethargic encephalitis	2	2			9	8	2	2
Measles	518	160	605	154	676	166	921	191
Poliomyelitis	30	28	24	17	34	25	18	17
Rabies							2	1
Scarlet fever	487	194	580	226	506	200	652	242
Typhoid fever	1,383	596	1,110	505	731	361	834	434

JAMAICA

Communicable diseases—Four weeks ended January 3, 1931.—During the four weeks ended January 3, 1931, cases of certain communi-

cable diseases were reported in Kingston, Jamaica, and in the Island of Jamaica outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis		1	Leprosy		3
Chicken pox	1		Scarlet fever	2	5
Diphtheria		2	Tuberculosis	33	39
Dysentery	1	1	Typhoid fever	18	49

LATVIA

Communicable diseases—November, 1930.—During the month of November, 1930, cases of certain communicable diseases were reported in the Republic of Latvia, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	2	Puerperal fever	11
Diphtheria	99	Scarlet fever	152
Erysipelas	47	Tetanus	1
Influenza	274	Trachoma	102
Measles	49	Typhoid fever	89
Mumps	130	Whooping cough	146
Poliomyelitis	5		

PORTO RICO

San Juan—Communicable diseases—Five weeks ended December 27, 1930.—During the five weeks ended December 27, 1930, cases of certain communicable diseases were reported in San Juan, Porto Rico, as follows:

Disease	Cases	Disease	Cases
Diphtheria	6	Trachoma	1
Malaria	13	Whooping cough	26
Tetanus	1		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Week ended— Oct. 25, 1930	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27	January, 1931: 3	10	17	24
Afghanistan	C	P																
China:																		
Amoy	C		2															
	D		2															
Canton	C			1	1													
Shanghai	C		34	38	1		1											
	D		3	4														
Shensi Province	C		P															
Swatow	C	3	2															
Tientsin	C	2	1															
India	C	42,893	51,551	36,529	5,222	5,689	4,146	3,887										
	D	22,358	23,959	17,635	2,733	2,915	2,149	1,985										
Bassein	C		1															
Bombay	C	14	1	16	17	1	1		2	2	4	5					20	
	D	8	2	11	10	6	1		2	1	1	3					6	
Calcutta	C	63	27	24	7	7	11	8	4	6	2	10	9	7	6	6		
	D	30	12	15	4	2	6	4	4	4	1	7	6	4	5	5		
Madras	C	1		2		1							14	44				
	D	1		2									8	12	19			
Rangoon	C	1	2	1										1				
	D	1	1	1										1				
Tuticorin	C			1				1	4		1		1					
	D			1				1										
India (French):																		
Chandernagor	C		1	3				1		1								
	D			1									1					
Pondicherry	C			1				1	1	1	1	1	3	9				
	D			1					1	1	1	1	3	3				
India (Portuguese)	C	1	1			3	9	2										
	D		1			3	5	1										

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Week ended— Oct. 25, 1930	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27	January, 1931: 3	10	17	24
Indo-China (see also table below):																		
Pnompenh	C	11		2	1					1	1							1
	D	6								1	1							
Saigon and Cholon	C	5		2	1					1		2	1		4	4		
	D	1								1					2	2		
Philippine Islands: [1]																		
Ports—																		
Cebu	C	9	2															
	D	8	2															
Iloilo	C	64	10	1						1					1			
	D	56	14	4						3					1			
Manila	C	1	43	5														
	D		12	1														
Provinces—																		
Antique	C	20	47	40														
	D	12	34	18														
Bohol	C	138	49															
	D	79	20															
Bulacan	C	1	4	2														
	D		2	1														
Capiz	C	2	1															
	D	2																
Cebu	C	85	25															
	D	50	11															
Iloilo	C	571	238	50	10	10	4	6	11	21	13		7	5	13	3	11	41
	D	376	151	40	7	7	3	6	8	11	8		6	4	10	2	9	27
Masbate	C	34																
	D	14																
Negros, Occidental	C	343	122	28	12	3	19	22	44	38	48	33	28	19	33	40	19	32
	D	237	91	20	12	3	12	14	33	17	45	28	22	16	26	33	15	17
Negros, Oriental	C	8																
	D	4																
Pampanga	C		1															
Pangasinan	C	1																
	D	1																

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Oct. 25, 1930	Nov. 1	Nov. 8	Nov. 15	Nov. 22	Nov. 29	Dec. 6	Dec. 13	Dec. 20	Dec. 27	Jan. 3	Jan. 10	Jan. 17	Jan. 24
Samar	C	18	4	7	6	3	4	3	4	4			2		12	2		
	D	16	2	7	5	1	4	2	4	4			1	1	7	1		
Sorsogon	C						5											
	D						4											
Surigao	C	25	1	(¹)														
	D	17	2															
Tarlac	C	1																
Siam	C	3		4	3		1		2	1	1	2			2	1		
	D	2		1	3		1		2	1	1	2			2	1		
Bangkok	C	1		3	1	2			2	1		1	2	1	1	2		
	D	1		2	1	1			2	1		1	2	1	1	1		
On vessel: S. S. Malwa from Shanghai	D		1															

Place		June, 1930	July, 1930	August, 1930	September, 1930			October, 1930			November, 1930			Dec. 1-10 1930
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30	
Indo-China (French) (see also table above).														
Annam ³	C	16	1	3										
Cambodia ³	C	144	43	59	23	13	2	16		6		1		28
Cochin-China ³	C	273	46	27	9	6	18	14	6	8		5		8

PLAGUE

Place		July, 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Week ended—													
					Oct. 25, 1930	November, 1930					December, 1930				January, 1931			
						1	8	15	22	29	6	13	20	27	3	10	17	24
Algeria:																		
Algiers	C	7	11	6	5	3	1	2			1	1	1				1	
	D				3													
Constantine	C						1							3	1	1		
Oran	C	4	10	10	1			1										
	D		1	3														
Plague-infected rats			10	6	1													
Philippeville	C		1	3	1		1									1		
Argentina: Cordoba Province—Chazon	C											1						1

¹ Figures for cholera in the Philippine Islands are subject to correction.
² During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, P. I.
³ Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases, D, deaths; P, present]

Place		July, 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Week ended— Oct 25, 1930	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27	January, 1931: 3	10	17	24
Belgian Congo	C	2	5					1				1						
	D	2	3					1				1						
British East Africa (see also table below):																		
Tanganyika	C														3			
	D														3			
Uganda	C	236	202	165	53	37	34	47	37									
	D	229	191	164	53	36	33	46	37									
Canary Islands: Las Palmas	D	1																
Ceylon: Colombo	C	2	2	3				1	1		4	4	4		4	1		
	D	2	3	3				1	1		3	4	4		4	1		
Plague-infected rats								1	1	1								
China:																		
Manchuria—Tungliau and Nungan	C	30	29	2														
Shensi	C		P		P													
Dutch East Indies:																		
Batavia and West Java	C	83	79	107	41	36	27	39	53	56	41	58						
	D	83	76	103	42	37	28	39	53	56	39	58						
Plague-infected rats		1	3															
Java and Madura	D	188	260	335	124	140	107	130	137	127	132	161	159					
Egypt:																		
Alexandria	C	11	10	9	2	1	1	3		1	1	2	1	1			1	
	D	6	8	6	3		2	2				1						
Assiout	C						3			2		7	5	1		1	2	
	D						1					1				1	2	
Aswan	C									3								
Beni-Suef	C	1															1	
Deirout	C																	19
	D																	2
Gharbieh	C	3																
	D	1																
Girga	C		1										3	1	3			
	D													1	1			
Manfalut	C															23	5	21
	D															5	2	3

Minieh	C											1						1
Port Said	C	1			1	1												
France: Marseille	C		5	4	2	1		1										
Gambia	C	4																
	D	4																
Greece (see also table below): Pyrgos	C			2														
India	C	877	2, 497	2, 371	604	616	558	943										
	D	477	1, 132	1, 068	333	288	317	556										
Bassein	C		2			1										2		
	D		3													1		
Bombay	C		1	2	1													
	D		1	2		1												
Plague-infected rats		35	47	64	2	9	11	8	11	5	12	4	10	4	6			
Madras Presidency	C	81	127	196	69	31	45	40	34	62				4				
	D	34	57	110	43	22	37	22	24	26								
Rangoon	C	3	10	2		1		1						1	1			
	D	2	9	2		1								1				
Plague-infected rats		7	8	1	1				1	1			1					
India (Portuguese)	D	P				3												
Indo-China (see also table below).																		
Pnompenh	C	4	3	2					1	3	1	1	1				1	
	D			3	1				1	3	1	1	1				1	
Saigon and Cholon	C	1	1	1														
Iraq: Baghdad	C	9		1				P	2	2								
	D	3		1					1	1								
Kwang-Chow-Wan	C	1																
Madagascar (see also table below): Tamatave	C	2	1	1	3		2			2	1	1		2				
	D			1	3					2		1						
Morocco	C	15			4		1						9		10			
	D	2											4		4			
Nigeria: Lagos	C	7	6	5	33	1	2	2	4	3	2		2		1			
	D	7	6	5		1	2	2	4	3	2		2		1			
Plague-infected rats		8	10	11	3	1	2	7	1	1	1	2	4					
Peru: Lima.[1]																		
Senegal (see table below).																		
Siam	C	7	3	1	3	1	1	1										
	D	6	2		3	1		1										
Bangkok	C	3						1				1		1	2			
	D	2						1				1		1	2			
Nagara Rajsima	C	2	1	1				1		3		8	4	3	4	6		
	D	2	1	1				1		3		6	3	3	1	3		
Syria: Beirut	C	2	5		1	1	3	1								1		
Tripolitania	C	2							4	6	2	1						
Tunisia:																		
Sfax district	C	1																
Tunis	C					1		1				P	12			1	1	
Union of Socialist Soviet Republics: Salsk region	C	7																
	D	5																

[1] Eight cases of plague were reported at Lima, Peru, during December, 1930. Plague infection is said to exist in interior towns north of Lima.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		July, 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Week ended— Oct. 25, 1930	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27	January, 1931: 3	10	17	24
Union of South Africa:																		
Cape Province	C	1	1		1					P	P							
	D	1	1															
Orange Free State	C		2															
	D		2															
On vessel: S. S. Marionga de Thermiotis, at Avonmouth	C													1				

Place		June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930
British East Africa (see also table above):							
Kenya	C	107	97	87	53	58	62
Greece (see also table above)	C	1				2	
Indo-China (see also table above)	C	11	1	2	4		
Madagascar (see also table above):							
Antsirabe Province	C	3	24	11	21		
	D	3	24	11	21		
Miarinarivo Province	C	1	1	2	7		
	D	1	1	2	7		
Moramanga Province	C	3		27	18		
	D	3		27	17		
Tananarive Province	C	16	28	39	79		
	D	16	28	38	79		
Senegal:							
Baol [1]	C	2	62	79	48	53	
	D	2	48	20	23	35	4
Dakar [1]	C	53	140	108	3		
	D	117	122	90	8		
Louga [1]	C	60	138	75	61	37	10
	D	21	103	33	30	25	3
Thies [1]	C	52	54	34	12	24	27
	D	35	30	20	4	15	23
Tivaouane [1]	C	43	119	110	20	53	31
	D	28	70	54	14	31	25

[1] Reports incomplete.

SMALLPOX

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Week ended— Oct. 25, 1930	November, 1930					December, 1930				January, 1931			
						1	8	15	22	29	6	13	20	27	3	10	17	24
Algeria:																		
Algiers	C	3											1					
Constantine	C						1											
Oran	C											3						
Brazil:																		
Porto Alegre (alastrim)	C	1	1	26		14	14	8	20	8								
Rio de Janeiro	C						2											
British East Africa (see also table below): Tanganyika	C	242	522	95	3	1		13	7	26	18	334						
	D	37	60	6	1					1		35						
British South Africa: Southern Rhodesia	C	1	1	153	2	54	1	38	12									
	D								2									
Canada.																		
Alberta	C	1	1	22					1						19			
British Columbia—Vancouver	C	6	2	2		3					1				1	2		
Manitoba	C		1															
Winnipeg	C															1		
Ontario	C	20	10	19	16	20	9	14	7	12	3	1	1		8	8	10	
Kingston	C													2	4		1	
North Bay	C													1		1		
Ottawa	C	7	5		14		9	14		8	1	1			2		1	1
Sault Ste. Marie	C															1	11	8
Toronto	C		1							2	2							
Quebec	C	5							1			1						
Montreal	C	7																
Saskatchewan	C	8	1	3		2			2		16						7	
China·																		
Changking	C	P	P	P	P	P	P	P	P		P	P						
Foochow	C	P	P	P		P		P		P		P						
Hong Kong	C													1				
Manchuria—																		
Harbin	C	2				1												
Kwantung—Dairen	C								2		1	1	1					
	D											1						
Nanking	C	P	P	P	P	P	P				P	P	P		P			
Shanghai—																		
Foreigners only	C	3	18	1	1		1				3	5	4	2	6			
Including natives	D		2					1				4	5		1	4		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Week ended— Oct. 25, 1930	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27	January, 1931: 3	10	17	24
China—Continued.																		
Swatow	D	4	2	4	1	1		1	1			2		2	1	2		
Tientsin	C			1			1		1	1								
Chosen (see table below).																		
Colombia:																		
Barranquilla	C	2																
Buenaventura	C	2																
Cali	D			2							1							
Curacao (alastrim)	C	1																
Dutch East Indies:																		
Java—Batavia and West Java	C	12	11	14	2	13	11		2		2	2	2		2			
	D	5	4	4	2	1	1		1			1			1			
Sanggi Islands	C	36	14		29													
	D	2	3		3													
France (see table below).																		
Great Britain:																		
England and Wales	C	344	341	325	86	87	92	107	116	160	95	137	138	135	164	228		
Bradford	C		3	1	1						1				1			
Cardiff	C			1														
Leeds	C			1			2								2			
London	C	164	120	29	32	41	47	32	67	27	48	42	27	38	48			
London and Great Towns	C	268	223	52	58	68	82	88	136	74	112	111	105	131	162			
	D		1		1					1								
Stoke-on-Trent	C	2	1		1													
Scotland	C	5																
Honduras:																		
Naco	C		5															
Puerto Castilla	C															4	7	
India	C	4,877	3,131	2,322	570	499	644	699										
	D	1,246	680	572	242	104	108	152										
Bombay	C	12	6	1							1				1			
	D	10	5								1				1			
Calcutta	C	25	14	12	2	4	3		3	5	6	4	10	19	15			
	D	21	9	11	2	2	3		3	2	4	2	7	13	10			

Cochin	C	14	3	12	3	5	10	7	4	5	6	7	6	7	2			
	D		1	1	1			2	2		2							
Karachi	C	4	4						2	1								
	D	3	2							1								
Madras	C	38	34	19	2	1	2	4	3	5	6	6		1	3			
	D	11	6	8			2				2	1			1			
Moulmein	C	2	1															
	D	1	1															
Negapatam	C	4	9	14	2	2	2	3	3		1	2						
Rangoon	C	3		2			1			1								
	D						1											
Tuticorin	C			1														
Vizagapatam	C			1														
India (French):																		
Chandernagor	C		3	3		3												
	D		2	1		1												
Karikal	C	9	5	1														
	D	9	2	1														
Pondicherry Province	C	22	35	38	2	2		7	7	7		5	8	1				
	D	22	33	36	2	2		7	7	5		5	7					
India (Portuguese)	C	9	4															
	D	2																
Indo-China (see also table below):																		
Pnompenh	C			2						1				2				
	D	1								1								
Saigon and Cholon	C	1	1			2			2	1		1						
	D	3	1			2			1			1						
Iraq:																		
Baghdad	C	1	1	2														
	D	1																
Mossoul Liwa	C			69			6		7	9						1		
	D			27					1	1								
Ivory Coast (see table below).																		
Mexico (see also table below)																		
Jalisco (State) Guadalajara	D	1		3	1		1	1	1		2							
Juarez	C	2																
	D	1		1	1													
Mexico City and surrounding territory	C	10	12	13	1	3	3	2	1	2		3						
	D	6	5	3	1		1					6						
Vera Cruz	C					1												
Morocco (see table below).																		
Nicaragua: Porto Cabezas	C												2					
Poland	C				2	3		3	1	2								
Portugal																		
Lisbon	C	50	27	16	12			8	11		15	11	21	17				
Oporto	C	1																
Siam	C			1														
Somaliland, British. Boales	C			1			1				1							
	D			1														
Spain	C	2	5		14	5	11	21	23	21	23		19	31				
Straits Settlements	C	8	6	5	3	3	4		3	9	1	3	3		2			
	D	3	1	1		1	1		1	2		2	2		1			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Week ended— Oct. 25, 1930	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27	January, 1931: 3	10	17	24
Sudan (Anglo-Egyptian)	C	42	128	82	3			2		3		47		47		17		
	D	3	52	7				1				5		5		1		
Sudan (French) (see table below).																		
Switzerland: Berne Canton	C	2		1														
Syria (see table below).																		
Tunisia: Tunis	C			2											13			
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C		P	P	P	P	P	P	P		P							
Orange Free State	C	P				1	1	P	P	P	P							
Transvaal	C	P	P	P	P	P	P	P	P	P	P							
Upper Volta	C									6								
On vessel: S.S. Muncaster Castle at Manila from Hong Kong.	C													1				

Place		June, 1930	July, 1930	August, 1930	September, 1930: 1-10	11-20	21-30	October, 1930: 1-10	11-20	21-31	November, 1930: 1-10	11-20	21-30	Dec. 1-10, 1930
Indo-China (see also table above)	C	213	238	93	54	52	86	32	62	164		86		38
Ivory Coast	C									4		2		9
Sudan (French)	C	76	34	39		P			17					43
	D	18		3					2					16
Syria: Beirut	C	7	2	1										

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930
British East Africa (see also table above):						
Kenya	C	186		424		
Chosen	C	3	2			
Seishin	C	2				
France	C	1				
Mexico: Durango (see also table above)	D	3	3	2		
Morocco	C	3	8	4	4	20
Turkey	C	51	21	19	74	
	D	13	4	2	1	

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		June 29-July 26, 1930	July 27-Aug 23, 1930	Aug. 24-Sept. 20, 1930	Sept 21-Oct 18, 1930	Week ended— Oct 25, 1930	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27	January, 1931: 3	10	17	24
Algeria:																			
Algiers	C	6	2	3				1			2								
Constantine Department	C	2	3		2	1					1		1			3			
Oran	C	3	1	1	3						3		2						
Bulgaria	C	10	1	4	6			1	2	1	1	3	6	3					
	D	1												1					
China:																			
Manchuria—Harbin (see also table below)	C	2	2	2	1							1							
Shanghai	C		1																
Chosen (see table below).																			
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C	1	1	3	1				2	1	1								
	D			1					2										
Beheira Province	C	15		1										1					
	D	2												1					
Cairo	C		7	2									1	1					
Port Said	C		4	1	1	1	1												1
Great Britain: Scotland—																			
Clydebank	C															3			
Dunfermline	C	1																	
Greece (see table below).																			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		June 29-July 26, 1930	July 27-Aug 23, 1930	Aug. 24-Sept 20, 1930	Sept. 21-Oct 18, 1930	Week ended— Oct. 25, 1930	November, 1930					December, 1930				January, 1931			
							1	8	15	22	29	6	13	20	27	3	10	17	24
Ireland:																			
Irish Free State—																			
Galway County—Oughterard	C	2																	
Leitrim County—Mohill	C	1																	
Mayo County—																			
Ballina	C	1																	
Castlebar	C		1																
Westport	C	2	1																
Roscommon County—																			
Roscommon	C	1																	
Strokestown	C	1																	
Wicklow County—Shillelagh	C	1																	
Latvia (see table below).																			
Lithuania (see table below).																			
Mexico:																			
Durango	D			1	2														
Mexico City, including municipalities in Federal District	C	5	9	7	8	1	1	5	4	1	1		12						
	D		2	2	2	1		3		2	3		2						
San Luis Potosi	D											1	1						
Morocco	C	11	8	2		1		1	1	1				8					
	D				1														
Palestine	C	6	3	3	3			2	1	1	6			1	1		2		1
Poland	C	36	34	23	22	7	8	15	7	12		21	9		5	28	11		
	D	4	3	1	2					1		3	3						
Portugal: Oporto	C		1		2		2	1	1	2	2	2							
Rumania	C	28	9	4	14	4	13	10	14	19		2							
	D	8	2					1	1	1									
Spain	C	3		1	2			4				1							
	D	1		1	2							1							
Tunisia	C	24	10	6	12					5		23							
Turkey (see table below).																			

Place																			
Union of South Africa:																			
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P							
Municipality of East London	C	1		2	1				1	1									
Natal	C	1	P	P	2	P	P	P											
Orange Free State	C	P	P	P															
Transvaal	C	P	P	P	P	P	P	P	P	P	P								
Yugoslavia (see table below).																			

Place		June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930
China: Harbin (see also table above)	C		14	5		3	
Chosen: Seoul	C	2	3	2	1	7	1
Czechoslovakia	C	1		1			16
Greece: Athens	C	3	6	6	4	4	4
Latvia	C	3	3	1	2		
Lithuania	C	16	18	7	24	1	5
	D			1	2		1
Turkey	C	2	7	11		28	3
Yugoslavia	C	6		2		2	2
	D			1		1	

YELLOW FEVER

	Cases
Brazil.	
Campos, Rio de Janeiro Province, May 23, 1930	1
Para—	
June 23, 1930	2
July 29, 1930 (death)	1
Gold Coast	
July 10, 1930	1
Albosso, Aug. 4, 1930 (death)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

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FEBRUARY 13 - - 1931

SPECIAL ARTICLES

Prevalence of Influenza in the United States and Europe

Virus of Typhus Type derived from Fleas taken from Rats

Influence of Arsenicals and Crystalline Glutathione on Oxygen Consumption of Tissues

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg Gen R C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of public health.

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PUBLIC HEALTH REPORTS

VOL. 46 FEBRUARY 13, 1931 NO. 7

THE PREVALENCE OF INFLUENZA

United States.—A wave of respiratory diseases, including the "common cold" and cases diagnosed as influenza, has swept over parts of the eastern section of the United States.

In New York City the number of cases of influenza reported increased from 68 for the week ended January 3, 1931, to 1,140 for the week ended January 24. The next week the number dropped to 646 cases. New Jersey reported 26 cases of influenza for the week ended January 3, 1931, and 967 cases for the week ended January 31. Maryland, North Carolina, and South Carolina reported similar increases in the prevalence of influenza.

The table on pages 358 and 359 shows that for the week ended January 31, 1931, 12,828 cases of influenza were reported to the Public Health Service. Of these cases nearly two-thirds (8,461) were in the South Atlantic States, and 60 per cent (7,785) were in the three States of Maryland, North Carolina, and South Carolina.

Many States reported increased prevalence of influenza for the week ended January 31 as compared with the preceding weeks, but the figures were comparatively small except in the Eastern and Southeastern States.

The death rate in large cities for the week ended January 31, as reported to the Bureau of the Census, was 15.2 per 1,000 population, as compared with 13.7 per 1,000 for the week last year and an average of 14.3 for the corresponding weeks of the last five years.

Europe.—Incomplete reports from European countries indicate that the prevalence of influenza increased in Poland in November. In December the disease was reported in Germany and France. Yugoslavia, Denmark, Switzerland, and Spain have also reported increased prevalence of influenza. In Europe the disease has been very mild. A report dated January 19, 1931, from the British Ministry of Health stated that there was no definite epidemic of influenza in England. There was a slight increase in influenza deaths, but they followed usual seasonal movements. The general mortality in the 107 great towns in England and Wales increased from 12.8 per thousand for the week ended December 27, 1930, to 17.2 per thousand for the week ended January 17, 1931.

TYPHUS FEVER

A VIRUS OF THE TYPHUS TYPE DERIVED FROM FLEAS COLLECTED FROM WILD RATS

By R. E. Dyer, *Surgeon*, A. Rumreich, *Passed Assistant Surgeon*, and L. F. Badger, *Passed Assistant Surgeon, United States Public Health Service*

The suggestion that some vector other than the body louse may be responsible for the transmission of the endemic typhus of the United States has been made by Brill (1), Allan (2), and Maxcy (3). The association of cases of a mild type of typhus with the handling of foodstuffs in Australia was noted by Hone (4) and in the United States by Maxcy (3). Wheatland (5) observed Australian cases apparently associated with mice. Fleas have been suggested as possible vectors by Maxcy, who also suggested the existence of a rodent reservoir (3).

In connection with our epidemiological investigation of cases of typhus it was found that several cases of endemic typhus had occurred on premises in the immediate vicinity of food handling establishments in Baltimore in the late summer and fall of 1930. On these premises evidence of heavy infestation with rats was observed. Rats were trapped at this place and combed for fleas. A rat nest was also found. Approximately 3 dozen fleas were secured from the rats and the nest on November 20, 1930. Twenty-four of these fleas were ground up in 4 cubic centimeters of normal saline, and 2 cubic centimeters of the resulting emulsion were injected intraperitoneally into each of two male guinea pigs. The remaining fleas were identified as *Ceratophyllus fasciatus* and *Xenopsylla cheopis*.

One of the guinea pigs injected with the suspension of ground fleas developed a febrile reaction seven days after inoculation and died six days later. The second animal developed a febrile reaction 12 days after inoculation. On the second day of fever this guinea pig was killed, the brain was removed and emulsified in 20 cubic centimeters of normal saline, and 2 cubic centimeters of this emulsion were injected into each of two fresh guinea pigs. One of them died after six days without having shown a febrile reaction. The second animal developed a fever eight days after inoculation. This animal was killed on the third day of fever and transfers were made to four fresh guinea pigs, heart blood and brain emulsion being used. One of these guinea pigs developed a febrile reaction five days after inoculation and also showed redness and swelling of the scrotum. This guinea pig was killed and transfers were made to fresh guinea pigs, using heart blood, brain emulsion, and testicular

washings. (In preparing the testicular washings for injection, the testicles were removed and washed in normal saline.) Since that time this strain has been carried for seven generations in guinea pigs, with the majority of the animals in each generation showing scrotal redness and swelling.

The course of the febrile reaction, the scrotal involvement, and the appearance at autopsy noted in these guinea pigs have corresponded to that noted by Maxcy for the Wilmington strain of endemic typhus virus (6).

Smears made from the tunica vaginalis and stained with Giemsa's stain have been made from 19 of these guinea pigs. Bodies similar to those described by Mooser (7) have been noted in three instances.

The brains from six guinea pigs taken approximately ten days after the onset of fever were examined histologically by Passed Assist. Surg. R. D. Lillie, who summarized the findings as follows:

FINDINGS

Guinea pig No.—

848. Lesions found are those seen in guinea pig typhus.
1073. Inconclusive for or against typhus.
1075. No evidence of typhus.
1100. No evidence of typhus.
1128. Probably typhus.
1151. Consistent with, but not definitely diagnostic of, typhus.

Two monkeys (*Macacus rhesus*) were bled and the blood sera tested for agglutinins for *proteus* X_{19} (type O). Both of these sera showed a partial agglutination of *proteus* X_{19} in the 1:40 dilution. These monkeys were then inoculated intraperitoneally with testicular washings from a guinea pig in the fifth generation from the flea. At the end of 12 days the agglutination titer of the serum from one of the monkeys had increased to complete in the 1:320 dilution while the second showed complete agglutination in the 1:160 dilution, and partial in 1:320 and in 1:640.

A febrile reaction began in both monkeys within two days after inoculation and continued six days in one instance and nine days in the other. Since a third uninoculated monkey kept in the same room ran a similar temperature, it is possible that the febrile reaction in the two inoculated monkeys may not have been specific. The uninoculated monkey did not show agglutinins for *proteus* X_{19} when tested 14 days after the other two monkeys had been inoculated. The temperature records of the two inoculated monkeys and one uninoculated monkey are shown in Table 1.

TABLE 1.—*Temperature records of two monkeys (Macacus rhesus) inoculated with a virus recovered from fleas and of an uninoculated monkey*

Day	Monkeys inoculated with virus on day 1				Uninoculated monkey, No. 399	
	No. 379		No. 380			
	a. m.	*p. m.*	*a. m.*	*p. m.*	*a. m.*	*p. m.*
1	39.2	[1] 38.6	39.0	[1] 39.0	39.6	39.4
2	39.1	39.3	38.6	39.4	39.5	39.4
3	39.1	39.7	39.4	40.1	39.1	39.6
4	40.8	41.1	40.8	40.9	39.1	40.0
5	....	[1] 40.5	39.4	[1] 40.2	40.8	41.0
6	40.1	40.6	39.4	39.8	40.1	40.3
8	40.3	40.9	40.1	40.7	40.0	40.2
9	40.5	[1] 40.0	39.0	[1] 39.8	39.8	39.9
10	40.3	40.4	38.8	39.2	39.6	39.4
11	39.8	41.3	39.0	39.5	39.2	39.4
12	39.5	41.0	39.3	39.5	38.8	38.8
13	39.0	[1] 39.3	....	[1] 39.6	....	39.2
15	38.8	39.7	39.2	39.4	39.0	[1] 39.1
16	38.8	38.7	39.1	39.4	39.3	39.4

[1] Blood serum tested for Weil-Felix reaction.

Six fresh rabbits were bled and their sera tested for agglutinins for *proteus* X_{19} (type O). One of these sera showed partial agglutination in 1:20, three showed partial agglutination in 1:10, and two sera were negative in all dilutions.

Three of these rabbits were inoculated with testicular washings from a guinea pig infected with virus in the sixth generation removed from the fleas and gave Weil-Felix reactions two weeks after inoculation as follows: One rabbit gave complete agglutination in the 1:80 dilution and partial in 1:160, the second complete in 1:160 and partial in 1:320, and the third complete in 1:320 and partial in 1:640. Table 2 gives the agglutination reactions shown by sera from these rabbits.

TABLE 2.—*Agglutination of proteus X_{19} (type O) by rabbit sera after inoculation of rabbits with a virus recovered from fleas*

Rabbit	Day tested	Dilution							
		1:10	1:20	1:40	1:80	1:160	1:320	1:640	1:1280
1019G	1	2	1	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0
	15	4	4	4	4	2	1	0	0
1019F	1	0	0	0	0	0	0	0	0
	9	4	2	1	0	0	0	0	0
	15	4	4	4	4	4	2	1	0
1019H	1	2	1	0	0	0	0	0	0
	9	3	2	0	0	0	0	0	0
	15	4	4	4	4	4	4	2	0

The remaining three rabbits were inoculated with testicular washings from a guinea pig infected with virus of the seventh generation and showed agglutinins for *proteus* X_{19} (type O) two weeks after inocu-

lation as follows: One rabbit's serum gave complete agglutination in a dilution of 1:40 and partial in 1:80, the second complete in 1:80 and partial in 1:160 and in 1:320, while the third showed complete agglutination in 1:320 and partial in 1:640. Table 3 gives the agglutination reactions shown by the sera from these rabbits.

TABLE 3.—*Agglutination of proteus X_{19}(type O) by rabbit sera after inoculation of rabbits with a virus recovered from fleas*

Rabbit	Day tested	Dilution							
		1:10	1:20	1:40	1:80	1:160	1:320	1:640	1:1280
1059D	1	3	2	1	0	0	0	0	0
	9	3	2	1	0	0	0	0	0
	15	4	4	4	2	0	0	0	0
1059C	1	0	0	0	0	0	0	0	0
	9	2	0	0	0	0	0	0	0
	15	4	4	4	4	3	2	0	0
1059E	1	2	0	0	0	0	0	0	0
	9	2	1	0	0	0	0	0	0
	15	4	4	4	4	4	4	2	1

Cross immunity tests between the flea strain and typhus strains have been hampered by the occurrence of secondary infections among the stock guinea pigs.

The results of one cross immunity test between the flea strain and New World endemic typhus virus are shown in Table 4. In this test four guinea pigs (W1501, W1509, W1518, and W1519) which had recovered from infection with the Wilmington strain of endemic typhus virus and four fresh guinea pigs (1123, 1124, 1125, and 1126) were inoculated with testicular washings from a guinea pig (1074) infected with virus of the seventh generation from the fleas.

TABLE 4.—*Temperature records of guinea pigs inoculated with endemic typhus virus (Wilmington strain) and later inoculated with a virus recovered from fleas, and records of control animals*

Day after inoculation	Guinea pigs inoculated with endemic typhus on Dec. 29 and 31			
	W1501	W1509	W1518	W1519
0	39.2	39.2	39.2	39.2
1	38.9	38 9	----	----
2	----	39.0	39.6	38.5
3	----	----	39.8	39.6
4	39 7	40.0	----	39.6
5	[1] 39.8	40 5	[1] 40.5	[1] 40.6
6	----	(1)	[1] 40.1	[1] 39.6
7	[1] 39 9	[1] 39.8	[1] 40.0	[1] 39.8
8	[1] 40 1	[1] 38.9	[1] 40.2	[1] 40.0
9	[1] 40 0	[1] 39.2	40.2	40.2
10	40 0	----	39 7	39.8
11	39.3	----	----	----
12	----	----	39.7	39.8
13	----	----	39.5	39.2

[1] Redness and swelling of scrotum.

TABLE 4.—*Temperature records of guinea pigs inoculated with endemic typhus virus (Wilmington strain) and later inoculated with a virus recovered from fleas, and records of control animals*—Continued

Day after inoculation	Guinea pigs inoculated with flea virus on Jan. 15							
	Fresh guinea pigs				Immune guinea pigs			
	1123	1124	1125	1126	W1501	W1509	W1518	W1519
0	39.4	38.7	38.8	39.3				
1	39.0	39.1	38.4	39.2	38.8	39.4	38.8	38.4
2	39.0	39.2	38.9	39.4	39.3	39.5	39.2	38.8
3	39.0	39.0	40.3	39.2	38.3	39.1	38.8	38.1
4	39.6	[1] 39.9	[1] 39.4	39.3	38.8	39.0	38.7	38.8
5	39.8	[1] 39.6	[1] 40.4	40.5	39.0	39.3	39.4	39.0
6	[1] 40.5	[1] 40.0	[1] 40.4	[1] 40.0	39.1	39.2	39.1	39.5
7	[1] 39.7	([2])	39.3	[1] 39.4	38.7	39.1	39.1	39.4
8	([2])		39.5	39.5	38.4	38.9	39.0	39.3
9			39.2		38.6	39.0	38.8	40.0
10				39.7	39.1	39.2	39.5	40.1
11			38.9	40.0	39.0	39.3	40.5	39.6
12			39.1	35.0	39.0	39.0	39.5	39.4
13			39.4	([3])	38.7	38.6	39.6	39.6
14			38.5		38.0	38.5	39.8	39.2
15			38.5		38.4	38.5	39.0	38.9
16			38.8		39.6	38.8	39.8	39.4
17			39.0		39.6	40.3	39.2	39.7
18			38.5		39.9	39.5	39.5	

[1] Redness and swelling of scrotum.
[2] Killed for transfer.
[3] Dead, undetermined cause.

In two instances fleas taken from rats caught at a second location in Baltimore where typhus fever had occurred have been ground up and injected into guinea pigs. As a result, two additional strains of virus have been established which, in temperature reactions and scrotal lesions, resemble closely the strain first established from fleas.

SUMMARY

Inoculation into guinea pigs of fleas removed from rats which had been trapped at a typhus focus resulted in the establishment of a strain of virus which produced a typhus-like reaction in guinea pigs. Monkeys and rabbits developed agglutinins for *B. proteus* X_{19} (type O) following inoculation with this strain of virus. Guinea pigs which had recovered from an attack of endemic typhus produced by the Wilmington strain of virus were apparently immune to a subsequent inoculation with the strain of virus recovered from the fleas.

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THE INFLUENCE OF ARSENICALS AND CRYSTALLINE GLUTATHIONE ON THE OXYGEN CONSUMPTION OF TISSUES

By CARL VOEGTLIN, *Chief of Division of Pharmacology*, SANFORD M. ROSENTHAL, *Pharmacologist*, and J. M. JOHNSON, *Chemist, National Institute of Health, United States Public Health Service.*

The purpose of this paper is to describe experiments designed to increase our knowledge of the chemical mechanism involved in the pharmacological action of arsenicals, and to contribute some new observations concerning the fundamental aspects of the utilization of oxygen by tissues. Rosenthal and Voegtlin (1930) recently have shown that crystalline SH glutathione has a protective action in rats, rabbits, and trypanosomes against the toxic influence of arsenious oxides. Previous work from this laboratory (Voegtlin, Dyer, and Leonard, 1923) had indicated that this action is more or less specific for certain sulphydril compounds and is not shown by the other tissue constituents so far examined. Rosenthal and Voegtlin furthermore found that the rate of oxidation of crystalline SH glutathione by molecular oxygen in the presence of a trace of hemin is considerably decreased by arsenious oxides. These and other findings which will not be mentioned were regarded as confirmation of our hypothesis that the action of arsenious oxides on living cells involves a chemical reaction with SH glutathione and possibly other SH compounds of protoplasm.

It has been known for some time that arsenious acid when added in relatively low concentrations to certain living cell-suspensions causes a marked decrease in their oxygen consumption (Onaka, 1911; Dresel, 1926). Warburg therefore regards arsenic, besides H_2S, HCN, and CO, as specific poisons of the "respiratory ferment," which, on the basis of his recent important studies, he considers as an iron containing compound chemically related to hemin.

After having clearly demonstrated the antagonistic function of SH glutathione on the arsenic action by means of various toxicity experiments, it was therefore important to determine whether or not SH glutathione is able to maintain the normal rate of oxygen consumption of tissues exposed to concentrations of arsenious oxides which as such cause a marked decrease in oxygen consumption. In view of the considerable quantitative and qualitative differences in the pharmacological action of various types of arsenicals, as revealed especially by the work of Voegtlin and Smith (1920), preliminary experiments were carried out to determine the effect on the oxgyen consumption of tissues of some of the theoretically and therapeutically most important types of arsenicals.

METHODS AND MATERIALS USED

The oxygen consumption was measured in Warburg vessels with Haldane-Barcroft manometers, using the technique described by Warburg and his collaborators (1926). The vessels were provided with a side arm, which permitted the addition of the solution of chemicals to the tissue during the course of the experiments. Air was used as a source of oxygen, and the CO_2 produced was absorbed by 5 per cent of NaOH placed in the special compartment of the respiration vessel. The following normal tissues of rats were employed: Liver, kidney, and testis. The animals were killed by decapitation, after which the tissues were rapidly removed and cut into small pieces, and weighed portions were introduced into the respiratory chambers. The weights of tissue given in the graphs of this paper are always expressed in terms of fresh weight.[1] The testicular tissue yielded a particularly even cellular suspension, which on microscopic examination revealed very little cell débris and a large number of normally appearing cells. For this reason the testis was used more often than the other tissues. The tissues were suspended in Locke solution containing 0.2 per cent glucose.[2] In some of the experiments the glucose was left out, as indicated in the detailed description of each series of experiments. These normal tissues were shown by Warburg to possess under aerobic conditions essentially an oxidative metabolism uncomplicated by aerobic glycolysis. It was of further interest to study the behavior of a malignant tissue, which exhibits a relatively high aerobic glycolysis. The Jensen rat sarcoma was used for this purpose, care being taken to select portions of small tumors showing no macroscopic necrosis. Locke's solution was also used in this case. Finally experiments were also made with baker's yeast suspended in phosphate buffer. The temperature of the water bath was always 37.6° C.

The crystalline SH glutathione was prepared by the method of Hopkins (1929), the crystals in some preparations being separated from the mother liquor by means of glacial acetic acid, according to Kendall (1929). This treatment should remove any minute traces of impurities, as iron, cysteine, etc. The S-S glutathione was prepared from the crystalline material by running at room temperature a stream of oxygen through a concentrated solution, neutralized with $Ba(OH)_2$, until the nitroprussid reaction became negative. After immediate and careful removal of the barium by H_2SO_4 the solution was rapidly concentrated *in vacuo*, precipitated with absolute alcohol, and dried to constant weight. Analysis showed 10.59 per cent S and 13.10 per cent N, indicating, as Hopkins had found previously,

[1] In the case of the testis the uniform suspension obtained by the addition of Locke solution to a weighed amount of tissue, was measured by means of a pipette.

[2] Locke solution used: 9.2 g. NaCl, 0.042 g. KCl, 0.18 g. $CaCl_2$, 0.15 g. $NaHCO_3$, and 1,000 cc. H_2O.

that the substance had undergone partial decomposition. It can be assumed, however, that a considerable part of the material represents S-S glutathione. At all events the substance did not contain sulphur in the reduced (SH) form.

The neoarsphenamine and sulpharsphenamine were commercial products, having passed the official requirements. Arsenoxide, i. e., the hydrochloride of 3-amino-4-hydroxyphenyl arsenious oxide, was prepared by the method of Ehrlich and Bertheim (1912). It contained 31.62 per cent As, all of which was trivalent, as shown by iodine titration. The 3-amino-4-hydroxyphenylarsonic acid was obtained by the method described in the same publication. It was repeatedly recrystallized and was chemically pure. The 4-hydroxyphenylarsonic acid was made according to Barrowcliff, Pyman, and Remfry (1908), and part of the substance was converted into 4-hydroxyphenylarsenious oxide according to D. R. P. 213594. Tryparsamide, i. e., N-(Phenyl-4-arsonic acid), glycineamide, was used as a crystalline chemically pure compound. Arsenious and arsenic acids were of high purity. The solutions of these chemicals were always carefully neutralized, thus avoiding a shift in the pH of the Locke solution and phosphate buffer. The concentration of the solutions is given in terms of normality with respect to arsenic in case of the arsenicals, with respect to S in case of glutathione, and with respect to Fe in the case of Mohr's salt.

RESULTS

Differences in action of different arsenicals.—These are clearly brought out by Figures 1, 2, and 3. All of the pentavalent arsenicals, i. e., arsenate, tryparsamide, 3-amino-4-hydroxyphenylarsonic acid, and 4-hydroxyphenylarsonic acid, exert either no influence on the O_2 consumption or produce only a moderate inhibition. Of the arsphenamines, sulpharsphenamine (Fig. 3), during the later part of the experiment, slightly decreased the rate of O_2 uptake, whereas in another experiment there was no difference as compared with the control at the end of the experiment. Neoarsphenamine, probably due to its ready oxidation in slightly alkaline media, markedly decreased the O_2 consumption of the tissue. The decrease is much more pronounced with arsenoxide. This influence of arsenoxide is shown in all experiments on normal tissues, the Jensen sarcoma, and yeast, indicating that the substance has a potent action on cells of widely different origin. 4-hydroxyphenyl arsenious oxide has the highest potency of these arsenicals.

These results on the influence of arsenicals on the O_2 consumption of tissues are of interest in relation to their pharmacological action as studied by Voegtlin and Smith (1920). These investigators arrived at the conclusion that arsenious oxides (R.AsO) are to be re-

garded as the directly acting form of arsenic, and that the arsphenamines (R.As=As.R.) and the pentavalent compounds ($R.AsO_3H_2$)

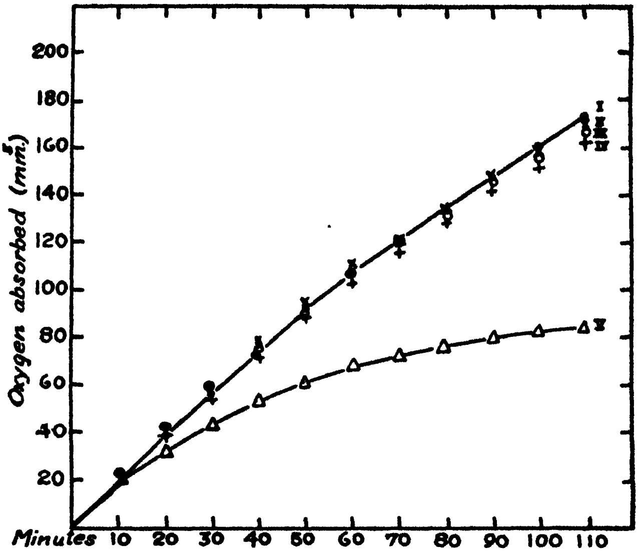


FIGURE 1.—0.3 g. testis in Locke solution without glucose. All arsenicals added at beginning of experiment. I=testis; II=testis+N/1000 arsenate; III=testis+N/1000 3-amino-4-hydroxyphenylarsonic acid; IV=testis+N/1000 tryparsamide; V=testis+N/1000 3-amino-4-hydroxyphenylarsenious oxide

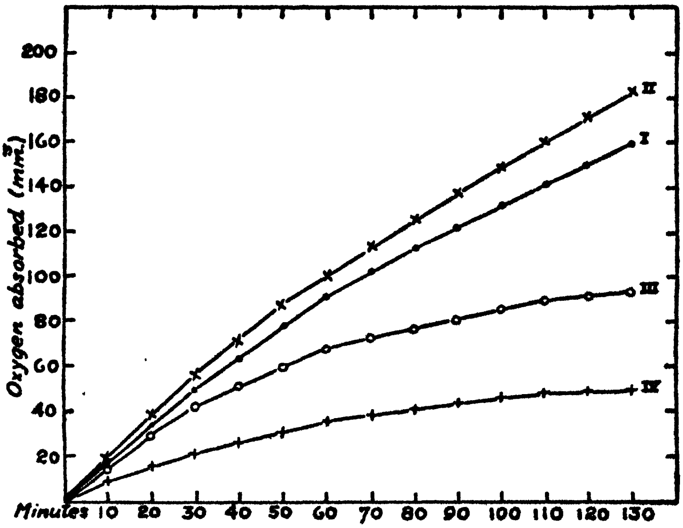


FIGURE 2.—0.3 g. testis in Locke solution without glucose. All arsenicals added at beginning of experiment. I=testis; II=testis+N/1000 4-hydroxyphenylarsonic acid; III=testis+N/1000 3-amino-4-hydroxyphenylarsenious oxide; IV=testis+N/1000 4-hydroxyphenylarsenious oxide

have to be converted by the animal body by partial oxidation or reduction respectively into the really active R.AsO modification. It

is obvious that this biochemical transformation requires time, a fact which evidenced itself by the latent periods of several hours in the trypanocidal action and the time of appearance of toxic symptoms in the host animal. It should be pointed out that the duration of the O_2 consumption experiments is relatively short, about two hours. This is evidently insufficient time for the tissue to reduce under prevailing conditions enough of the pentavalent arsenicals and there is consequently little or no effect on the O_2 uptake.[3] Chemical evidence shows that sulpharsphenamine is more resistant to oxidation than

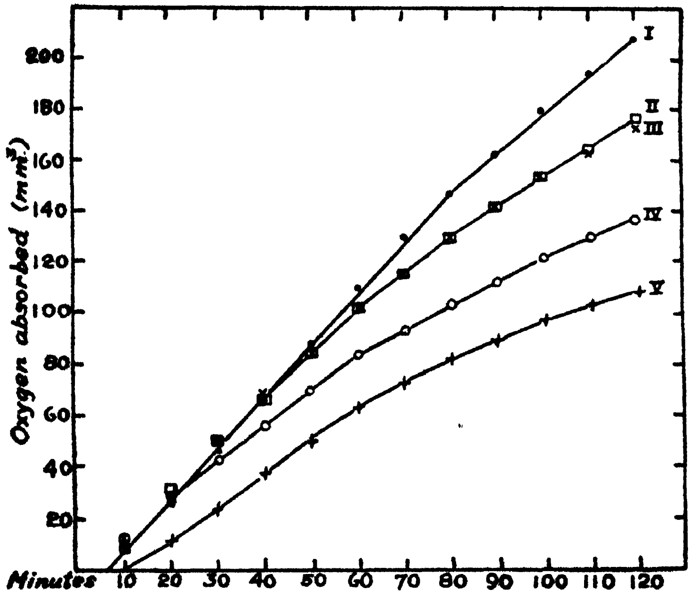


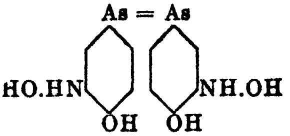
FIGURE 3.—0.3 g. testis in Locke solution All arsenicals added at beginning of experiment. I=testis; II=testis+N/1000 4-hydroxyphenylarsonic acid; III=testis+N/1000 sulpharsphenamine; IV=testis+N/1000 neoarsphenamine; V=testis+N/1000 3-amino-4-hydroxyphenylarsenious oxide

neoarsphenamine. This again is consistent with the more pronounced effect of neoarsphenamine on the O_2 consumption.

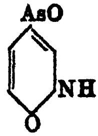
With reference to the great reduction in O_2 uptake produced by 4-hydroxyphenylarsenious oxide it should be pointed out that this result contradicts the suggestion of Mayer (1926) that about 90 per cent of the toxicity and possibly the chemotherapeutic action of the arsphenamines is due to chemical transformations in the ortho-aminophenol grouping. Mayer assumes, without proving it, that the NH_2 group is converted into a substituted hydroxylamine (A)

[3] Relatively low concentrations (N/1000) of these arsenicals were used. It is possible that higher concentrations, due to chemical mass action, might show more pronounced effects.

or that 3, 4-quinoneimine 1-arsenious oxide (B) is formed. Case A



(A)



(B)

is theoretically possible with arsphenamine, but Voegtlin and Smith (1920), by means of chemical as well as biological evidence, have shown that in the presence of O_2 and a slightly alkaline reaction the arseno linkage is broken with the primary formation of arsenoxide. The formation of hydroxylamine derivatives of neoarsphenamine and especially sulpharsphenamine is only a remote possibility, in view of the substituted nature of the NH_2 group, the substituent being especially firmly attached in sulpharsphenamine.

We furthermore know that pure arsenoxide exerts its toxic and trypanocidal action immediately (absence of latent period). The formation of a hydroxylamine derivative is an oxidative process. Mildly acting oxidants finally convert arsphenamine into 3-amino-4-hydroxylphenyl arsonic acid and the corresponding hydroxylamine derivative has never been made.

With regard to Case B, it is well to point out that 3, 4-quinoneimine 1-arsenious oxide has never been prepared. As this compound belongs to the R.AsO group it is to be expected to exert the action characteristic of this group.

At all events the experiments here described with 4-hydroxyphenylarsenious oxide, *containing no amino group*, which could form hydroxylamine or quinoneimine, clearly indicate that Mayer's suggestion has not much in its favor. He is evidently not aware of the fact that Ehrlich (1909) found this substance about equally effective in trypanocidal action as the corresponding NH_2 compound and that 4-hydroxyphenyl arsonic acid and 4, 4′ hydroxy-arsenobenzene are effective chemotherapeutic agents.

Antagonistic action of SH glutathione.—From the preceding results it was obvious that the arsenious oxides would offer the best opportunity to study the antagonistic action of SH glutathione. The experiments were therefore carried out with arsenoxide, 4-hydroxyphenylarsenious oxide, and arsenious acid in such concentrations as to produce a pronounced reduction in O_2 uptake of the tissues and yeast cell suspensions. In the preceding work on the protective action of SH glutathione on arsenoxide toxicity it was found that about 10 moles of SH glutathione was required to overcome the effect of 1 mole of arsenoxide. This ratio was therefore adopted for the present series of experiments. For each of these two proper

controls, tissue plus glutathione and tissue plus arsenic were run. The glutathione was added to the tissue simultaneously with the arsenic or after a varying interval.

Figures 4 to 8 illustrate the results obtained with testis, liver, kidney, and sarcoma. Exposure of these tissues to high concentrations (N/100) of glutathione caused no appreciable effect on the rate of O_2 consumption in the case of testis, liver, and sarcoma. The supernatant Locke solution at the end of the experiments gave a strong nitroprussid test, which indicates that at least part, if not all, of the SH glutathione has escaped oxidation. When the same solution of SH glutathione is added to kidney tissue (Fig. 7), the O_2 consumption is increased, and the nitroprussid test of the supernatant fluid at the end of the experiment is negative or faint. The extra O_2 uptake with kidney tissue in presence of glutathione can be accounted for by the volume of O_2 required to convert the SH to the S-S glutathione. The O_2 consumption of yeast in presence of glutathione is also increased within the limits of O_2 required for the oxidation of glutathione. We conclude, therefore, that *crystalline glutathione of high purity does not under the prevailing conditions exert a catalytic influence on the O_2 consumption* of these tissues and yeast. This question will be subjected to more detailed analysis in a subsequent paper.

The striking effect of SH glutathione in overcoming the diminution in O_2 uptake resulting from exposure of the tissues to arsenoxide or 4-hydroxyphenylarsenious oxide is clearly shown in Figures 4 to 9. In Figure 4, for instance, the rate of O_2 consumption of testis plus arsenoxide plus SH glutathione is the same as that of the tissue alone. This protective action of glutathione is still operative if this substance is added to the tissue 1, 5, or 15 minutes *after* the addition of arsenic and before the measurements were begun. A moderate increase in O_2 uptake was even observed (fig. 8), when 50 minutes intervened between the addition of arsenic and glutathione. A similar situation obtains in the experiment with yeast illustrated by Figure 9, which shows that the 26 per cent reduction in O_2 uptake produced by arsenoxide alone at the end of the experiment is cut to 5 per cent when the SH glutathione is added at the same time as the arsenic. The glutathione is less effective when an interval of 35 minutes intervenes between arsenic and glutathione addition.

Incidentally it should be mentioned that experiments with yeast showed that variation in the pH of the buffer used has a pronounced effect on the reduction of O_2 uptake caused by arsenoxide. As compared with yeast in the same buffer, the O_2 uptake in the presence of N/1000 arsenoxide was as follows: 78 per cent at pH 6.46, 93 per cent at pH 7.14, and 74 per cent at pH 7.84. These results are in harmony with the amphoteric character of arsenoxide and its low

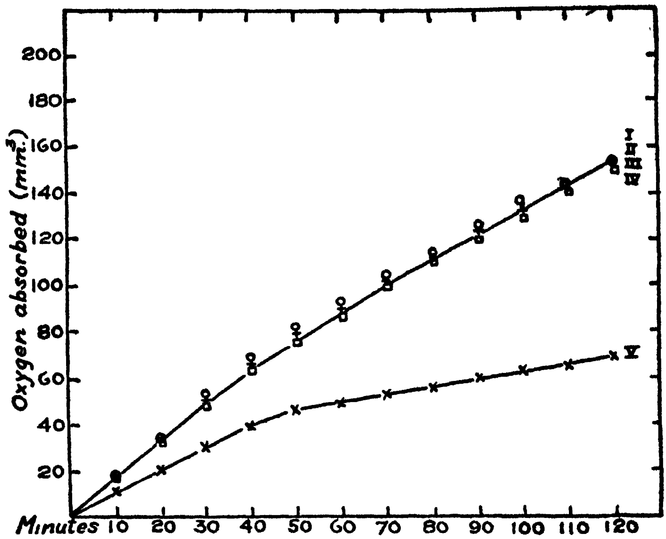


FIGURE 4.—0.3 g. testis in Locke solution. I=testis+N/100 SH glutathione; II=testis+N/1000 arsenoxide+N/100 SH glutathione added 1 minute after arsenoxide; III=testis+N/1000 arsenoxide+N/100 SH glutathione added 5 minutes after arsenoxide; IV=testis+N/1000 arsenoxide+N/100 SH glutathione added 15 minutes after arsenoxide; V=testis+N/1000 arsenoxide

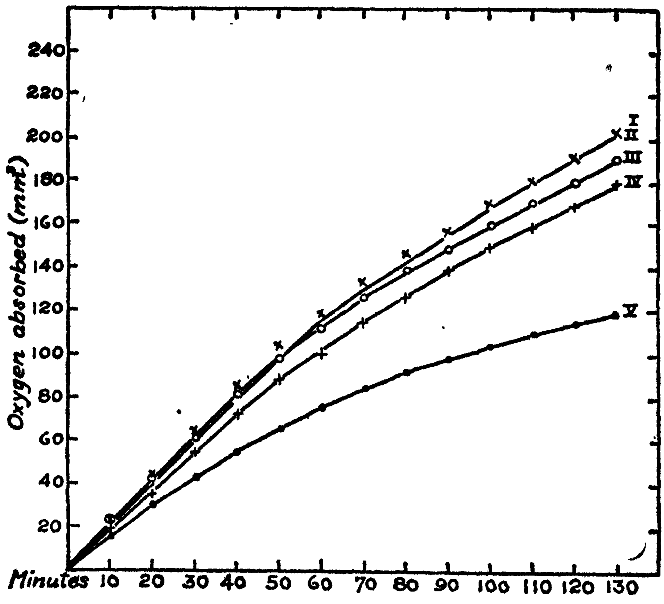


FIGURE 5.—0.3 g. testis in Locke solution without glucose. I=testis; II=testis+N/100 SH glutathione; III=testis+N/2000 4-hydroxyphenylarsenious oxide+N/100 SH glutathione; IV=testis+N/2000 4-hydroxyphenylarsenious oxide+N/200 SH glutathione; V=testis+N/2000 4-hydroxyphenylarsenious oxide

solubility at pH 7 and all experiments with this substance must, therefore, be carried out in a slightly acid or akaline medium.

In fact it is well to consider the solubility factor in all experiments dealing with the influence of chemicals on the metabolism of tissues by means of the Warburg technic. We believe that this factor, at least, partly accounts for the somewhat different results obtained with arsenious acid which will now be considered. Rosenthal and Voegtlin (1930) showed that the protective action of SH glutathione in rats and trypanosomes exposed to lethal concentrations of sodium

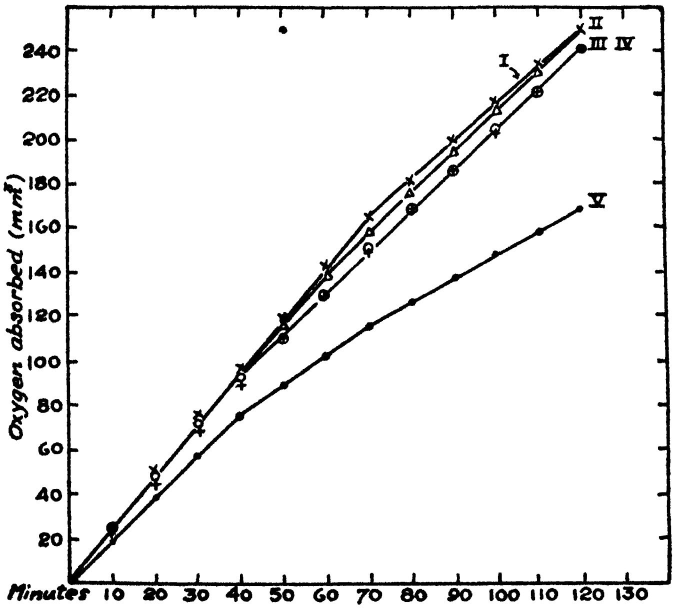


FIGURE 6.—0.3 g. liver in Locke solution. All chemicals added at beginning of experiment except in Case IV. I=liver; II=liver+N/100 SH glutathione; III=liver+N/100 SH glutathione+N/1000 arsenoxide, IV=liver+N/1000 arsenoxide+N/100 SH glutathione added 15 minutes after arsenoxide; V=liver+N/1000 arsenoxide

arsenite requires 40 moles of glutathione for each atom of arsenic, i. e., approximately four times as much glutathione as in the case of arsenoxide. The experiment (fig. 10) with testis indicates that if SH glutathione is used in this ratio (40:1) with respect to arsenite, the substance exerts a marked action on the O_2 consumption, as compared with the arsenic control. With a ratio of 20 to 1 the glutathione effect was less marked, and with 10 to 1 it was entirely absent. Further experiments with kidney and yeast, using a ratio of 10 to 1, were also negative.

No attempt was made to study the influence of a 40 to 1 ratio on kidney and yeast because in the presence of these cells glutathione oxidizes more or less rapidly, whereas in the presence of testicular

tissue the added glutathione largely remains in the reduced form. For this reason the testis is more suitable for these studies.

The next question was to determine if, according to our theory, the action of SH glutathione is due to its SH group. Figures 11 and 12 illustrate these experiments and show conclusively that the addition of S-S glutathione has no influence on the O_2 uptake of these tissues and that it is unable to overcome the great reduction in the O_2 consumption caused by arsenoxide. We conclude, therefore, that the

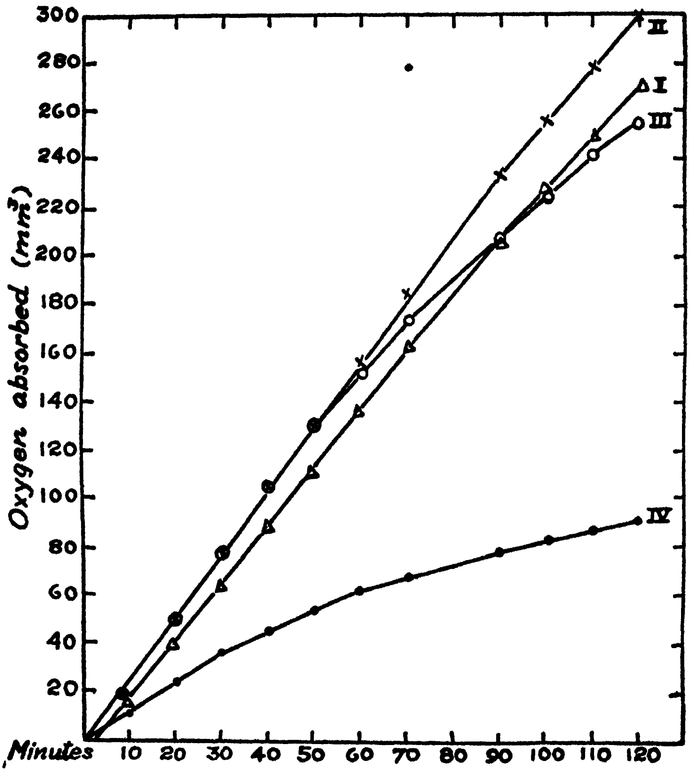


FIGURE 7.—0.1 g. kidney in Locke solution All chemicals added at beginning of experiment I=kidney; II=kidney+N/300 SH glutathione; III=kidney+N/3000 arsenoxide+N/300 SH glutathione; IV=kidney+N/3000 arsenoxide

effectiveness of SH glutathione is essentially due to its SH group with its chemical affinity for arsenious oxides, which may be expressed by the equation

$$R\ AsO + 2\ R.SH \leftrightharpoons R.As(SR)_2 + H_2O.$$

On chemical grounds a glutathione derivative of arsenious oxide $\left(R.As\begin{matrix}.SR\\.SR\end{matrix}\right)$ should reduce the O_2 uptake of tissues much less than the equivalent amount of arsenious oxide alone. Unfortunately we are not in a position to test the correctness of this assumption, as we have

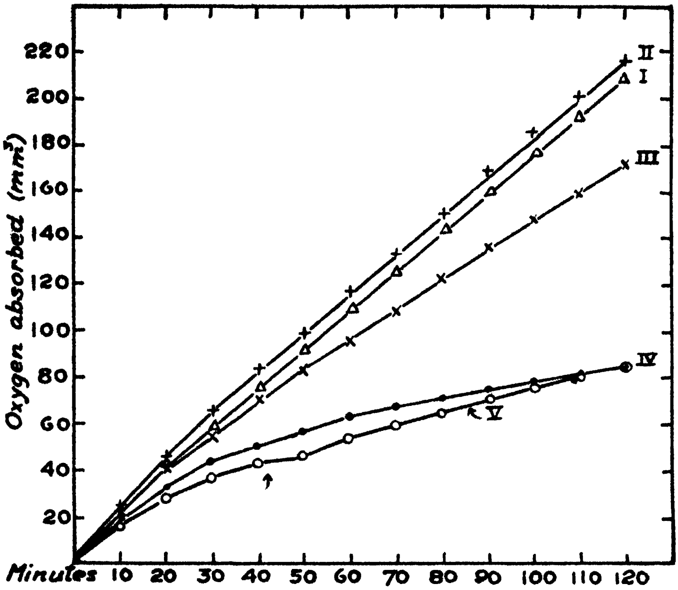


FIGURE 8.—0.185 g. Jensen sarcoma in Locke solution. All chemicals added at beginning of experiment except in Case V. I = sarcoma; II = sarcoma + N/100 SH glutathione, III = sarcoma + N/1000 arsenoxide + N/100 SH glutathione, IV = sarcoma + N/1000 arsenoxide; V = sarcoma + N/1000 arsenoxide + N/100 SH glutathione added 50 minutes after arsenoxide

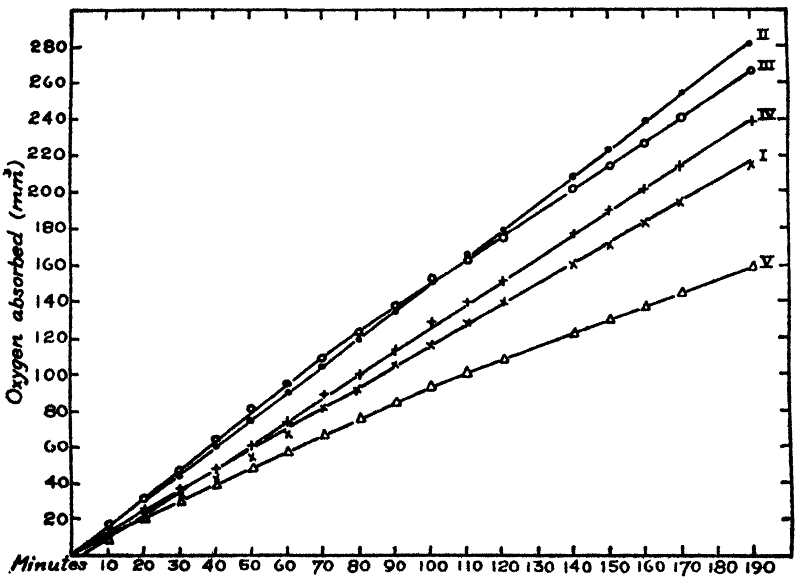


FIGURE 9.—4 mg. baker's yeast in phosphate buffer (pH 7.84) containing 0.2 per cent glucose. All respiration vessels contain M/20000 hemin. I = yeast; II = yeast + N/100 SH glutathione; III = yeast + N/1000 arsenoxide + N/100 SH glutathione; IV = yeast + N/1000 arsenoxide + N/100 SH glutathione added 35 minutes after arsenoxide; V = yeast + N/1000 arsenoxide

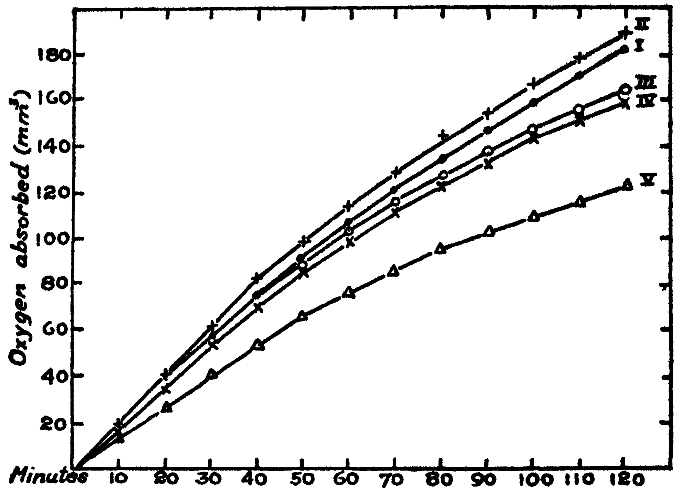


FIGURE 10.—0.3 g. testis in Locke solution without glucose. I=testis; II=testis+N/100 SH glutathione; III=testis+N/100 SH glutathione+N/4000 arsenite; IV=testis+N/4000 arsenite+N/100 SH glutathione added 5 minutes after arsenite; V=testis+N/4000 arsenite

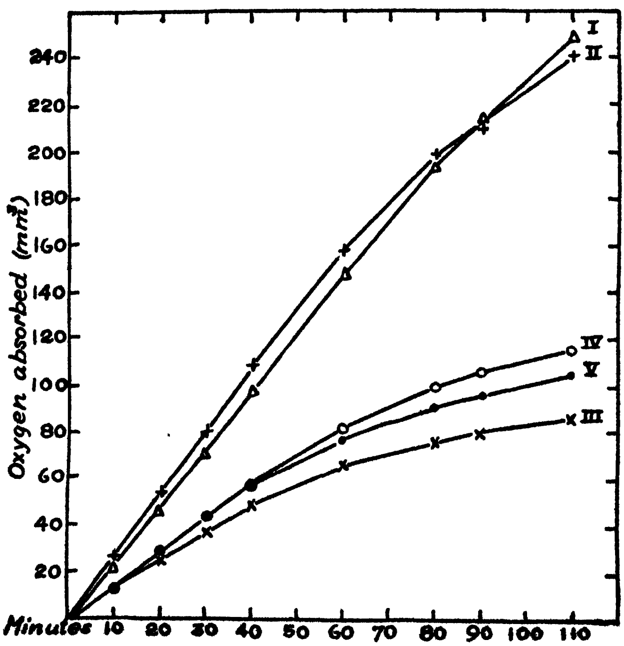


FIGURE 11.—0.3 g. testis in Locke solution. I=testis; II=testis+N/100 S-S glutathione; III=testis+N/100 S-S glutathione+N/1000 arsenoxide; IV=testis+N/1000 arsenoxide+N/100 S-S glutathione added 15 minutes after arsenoxide; V=testis+N/1000 arsenoxide

not yet been able to separate the arsenic-glutathione in pure form. Experiments with testis and tricysteinylarsine (Johnson and Voegtlin, 1930) indicate that this compound shows the same reduction in O_2 consumption as the equivalent amount of arsenious acid. This is probably due in part to a difference in the biological action of cysteine as compared with SH glutathione and partly to the dissociation of the cysteinylarsine with the liberation of arsenious acid.

In view of Warburg's theory, which assumes that the arsenic effect on the O_2 uptake of living cells is due to a specific chemical combina-

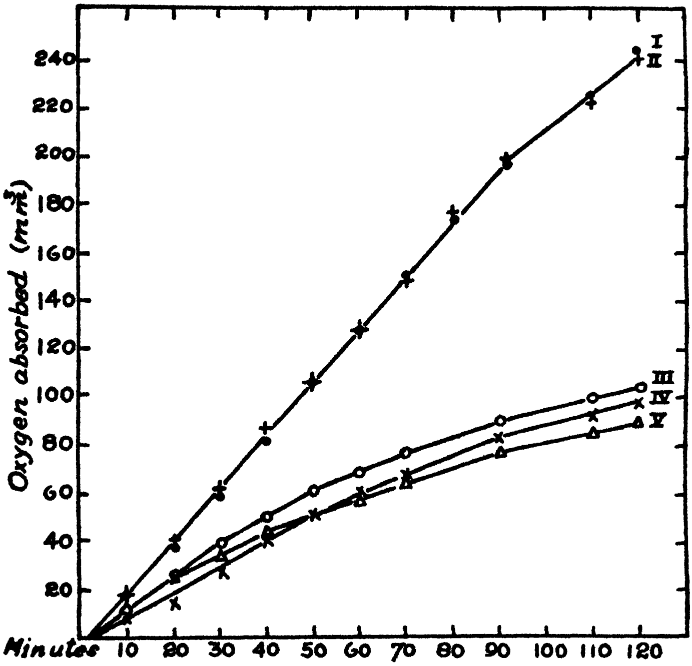


FIGURE 12.—0.1 g. kidney in Locke solution. I=kidney; II=kidney+N/300 S-S glutathione; III=kidney+N/300 S-S glutathione+N/3000 arsenoxide; IV=kidney+N/3000 arsenoxide+N/300 S-S glutathione added 15 minutes after arsenoxide; V=kidney+N/3000 arsenoxide

tion with the iron of the respiratory ferment, it was important to determine if iron compounds, as well as SH glutathione, could overcome the arsenic action on tissues. Figure 13 illustrates the negative outcome of such an experiment in which iron was used as Mohr's salt (ferrous ammonium sulphate). This negative result in itself is of course insufficient to reject Warburg's idea of the arsenic action, as this would require experiments in which the pure iron containing respiratory ferment is used in place of Mohr's salt. Such experiments are impossible at present, as the respiratory ferment has not been isolated. We are forced to conclude, therefore, that the positive evidence obtained in this and previous investigations strongly indicates that the pharma-

cological action of arsenious oxides on protoplasm involves a chemical reaction between arsenic and the SH glutathione of tissues.

The observations reported in this paper, besides being of pharmacological interest, have some bearing on that fundamental physiological and inadequately understood problem of the nature of the chemical substances primarily involved in the utilization of oxygen by tissues. The catalytic mechanism responsible for the activation of

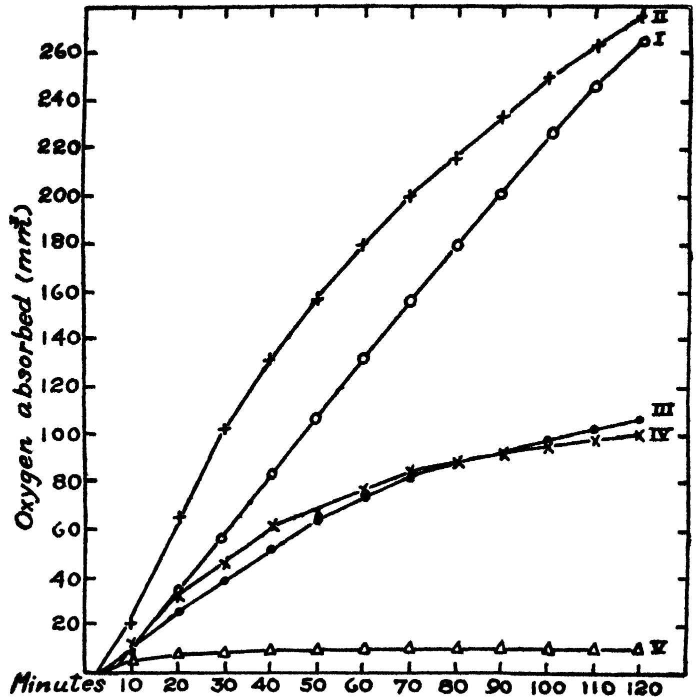


FIGURE 13.—0.3 g. testis in Locke solution. I=testis; II=testis+N/1000 $FeSO_4 \cdot (NH_4)_2 SO_4 \cdot 6H_2O$ (Mohr's salt); III=testis+N/1000 arsenoxide; IV=testis+N/1000 Mohr's salt+N/1000 arsenoxide; V=N/1000 Mohr's salt in Locke solution. The total O_2 uptake of Mohr's salt as shown in Curve V is considerably below the value as calculated on the basis of a complete conversion into the ferric state. This is due to the fact that oxidation was proceeding for some time before the readings were begun. In Curve II the rate of O_2 uptake during the first 30 minutes is considerably greater than in the control (Curve I). We can not definitely decide whether this indicates an actual catalytic effect of Mohr's salt on the O_2 uptake of the tissue

oxygen, as postulated by Warburg, probably is the primary chemical mechanism in the utilization of oxygen by tissues. But in view of the complexity of the chemical composition of cells it is quite possible that this catalytic mechanism may be influenced and controlled by other cellular constituents, as for instance glutathione, and that therefore this substance and other sulphydril compounds are concerned in cell respiration. The fact that the rate of O_2 consumption of tissues which has been greatly reduced by arsenoxide can be

restored to normal by the addition of SH glutathione is the first evidence that glutathione can influence the O_2 consumption of living tissues. The absence of any effect on respiratory rate from the addition of glutathione to tissues in the absence of arsenic is not necessarily inconsistent with this view. For it is conceivable that normal tissues may already contain glutathione in excess of the amount which can be utilized, so that further additions are ineffective in stimulating the O_2 consumption. The possibility that arsenic may act upon some other cellular constituent besides SH compounds is not supported by any evidence.

CONCLUSIONS

1. The addition of crystalline SH glutathione to kidney, liver, testis, the Jensen rat sarcoma, and baker's yeast does not increase the rate of O_2 consumption beyond the extra amount of O_2 required to oxidize the sulphur of the added glutathione. Oxidized glutathione has no accelerating influence on the O_2 consumption of kidney and testis.

2. Arsenious oxides (R.As.O) in relatively low concentrations cause a pronounced reduction in the rate of O_2 consumption. The pentavalent arsenicals ($R.AsO_3H_2$), including tryparsamide, in the same concentrations are devoid of any influence on the O_2 consumption. Of the arsenobenzene derivatives (R.As = As.R) sulpharsphenamine is ineffective, whereas neoarsphenamine due to its rapid oxidation reduces the O_2 consumption, but less markedly than arsenoxide. These results are in harmony with observations concerning the pharmacological and chemotherapeutic properties of these compounds, which distinguish the three groups, R.AsO, $R.AsO_3H_2$, and R.As = As.R.

3. SH glutathione when added to tissues in the ratio of 10 moles to 1 mole of arsenoxide prevents the reduction in O_2 consumption caused by arsenoxide alone. S–S glutathione is ineffective, showing that the action of SH glutathione is due to its SH group.

4. Ferrous ammonium sulphate is ineffective in overcoming the reduction in O_2 consumption produced by arsenoxide.

5. These observations add further evidence in favor of the theory that the pharmacological action of these arsenicals is essentially due to a chemical reaction with SH glutathione and possibly other SH compounds of protoplasm.

From the physiological viewpoint the results appear to indicate that glutathione in some as yet unexplained manner is concerned in the O_2 consumption of tissues *in vitro*.

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COURT DECISION RELATING TO PUBLIC HEALTH

Payment for services as local registrar of vital statistics denied.—(Louisiana Court of Appeal; Fox *v.* City of Monroe, 131 So. 483; decided Dec. 23, 1930.) In 1920 the plaintiff was appointed registrar of vital statistics for Ouachita Parish, which includes the city of Monroe. At the same time he was employed by the city of Monroe as secretary of the city board of health and city sanitary officer at a stipulated monthly salary. By statute the plaintiff was entitled, as compensation for his services as registrar, to a fee of 25 cents for each birth and each death reported, to be paid by the police jury of the municipality upon the warrant of the president and secretary of the State board of health. From 1920 to 1929, 28 warrants, aggregating $1,744.50, were drawn by the State board of health on the treasurer of the city of Monroe in favor of the plaintiff. None of these warrants for plaintiff's services in reporting births and deaths occurring in the city was paid by the city, and in 1929, after resigning his position with the city, he filed suit to collect them.

The city's defense was that during the said nine years the plaintiff had been employed by it as secretary of the board of health and sanitary officer, and that he had been informed that the person holding such position would be required to perform the duties of local registrar of vital statistics for the city without the payment by it of any sums other than the salary agreed upon. The plaintiff did not at any time during his employment by the city insist upon the payment of said warrants but apparently acceded to the city's demand that he do the work of the registrar for the city in connection with his other duties for which he was paid a salary. He testified that he knew if he pushed the claims for collection that he would be discharged. The judgment of the trial court in favor of the city was affirmed by the court of appeal. The latter court in its opinion said, in part.

Plaintiff, therefore, deliberately and intentionally chose the benefit of the salary paid by the city instead of that which arose under the warrants. He

knew that he could not claim both and with full understanding of his legal rights he made his choice. He can not now, after making a deliberate choice of the greater benefit of the salary and accepting it through all those years, be permitted to enforce this stale demand against the city.

* * * * * * *

"Waiver" is a voluntary act and involves the idea of assent and intention. Plaintiff voluntarily abandoned these claims against the city during the period of his employment and acceded to the city's refusal to pay them. His intention to do so is manifest from his conduct.

He abandoned his rights under these warrants for prudential reasons. He knew if he insisted upon their payment he would lose his position, and the salary which the city was paying him. Prudence and discretion prompted the course which he took.

"Where a person refrains from asserting his rights for prudential reasons, he is entitled to less favorable consideration than if his conduct has been that of mere inaction." 10 R. C. L. 402.

DEATHS DURING WEEK ENDED JANUARY 24, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended January 24, 1931, and corresponding week of 1930. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)

	Week ended January 24, 1931	Corresponding week, 1930
Policies in force	75, 130, 099	75, 467, 337
Number of death claims	15, 115	14, 091
Death claims per 1,000 policies in force, annual rate	10. 5	9. 7

Deaths [1] from all causes in certain large cities of the United States during the week ended January 24, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Jan. 24, 1931				Corresponding week, 1930		Death rate [2] for first 4 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (81 cities)	9, 890	14. 5	856	[4] 66	12. 7	819	14. 0	12. 9
Akron	40	8. 1	6	59	8. 6	8	8. 0	8. 4
Albany [5]	36	14. 5	3	59	17. 1	3	14. 4	16. 0
Atlanta	74	13. 9	12	123	17. 3	10	16. 5	16. 8
White	42		6	95		3		
Colored	32	[6]	6	172	[6]	7	[6]	[6]
Baltimore [5]	248	15. 9	13	44	16. 2	22	15. 4	15. 4
White	192		7	30		15		
Colored	56	[6]	6	94	[6]	7	[6]	[6]
Birmingham	82	15. 9	2	20	8. 8	2	15. 2	13. 1
White	45		2	34		1		
Colored	37	[6]	0	0	[6]	1	[6]	[6]
Boston	270	17. 9	18	51	13. 8	17	17. 0	15. 6
Bridgeport	37	13. 1	1	17	11. 0	6	13. 6	13. 6
Buffalo	160	14. 4	20	82	14. 6	18	14. 1	14. 4
Cambridge	30	13. 7	3	60	11. 9	3	14. 0	14. 3
Camden	39	17. 1	5	87	11. 0	8	17. 5	13. 5
Canton	26	12. 7	2	46	8. 4	4	11. 0	10. 9

See foot notes at end of table.

Deaths[1] *from all causes in certain large cities of the United States during the week ended January 24, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*—Continued

City	Week ended Jan. 24, 1931				Corresponding week, 1930		Death rate [2] for first 4 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Chicago [5]	768	11.6	73	65	11.2	70	11.3	11.4
Cincinnati	136	15.5	16	96	16.5	16	17.7	16.5
Cleveland	182	10.4	20	58	12.0	21	11.1	11.9
Columbus	80	14.1	5	49	15.0	7	14.2	14.8
Dallas	71	13.6	6		13.7	6	13.8	13.5
White	51		4			6		
Colored	20	[6]	2		[6]	0	[6]	[6]
Dayton	53	13.4	7	98	9.8	5	14.1	9.6
Denver	93	16.6	7	68	14.1	5	16.9	14.5
Des Moines	36	13.0	4	70	11.7	5	13.3	14.2
Detroit	264	8.3	22	35	9.8	57	8.5	9.7
Duluth	28	14.3	1	25	9.8	1	13.4	11.0
El Paso	46	22.9	10		16.2	1	23.6	21.5
Erie	29	12.8	2	37	14.3	1	11.1	11.4
Fall River [5] [7]	22	10 0	5	113	11.8	1	12.6	12.2
Flint	27	8 6	4	51	6.9	3	8.3	8.3
Fort Worth	39	12.1	6		14.3	5	13.0	12.4
White	31		6			4		
Colored	8	[6]	0		[6]	1	[6]	[6]
Grand Rapids	40	12.1	10	148	9.9	2	9.6	10.5
Houston	76	12.8	8		14.1	9	12.8	12.6
White	43		7			8		
Colored	33	[6]	1		[6]	1	[6]	[6]
Indianapolis	98	13.8	4	33	18.0	9	14.8	16.3
White	80		4	38		6		
Colored	18	[6]	0	0	[6]	3	[6]	[6]
Jersey City	103	16.8	12	107	11.5	8	13.2	12.4
Kansas City, Kans	39	16.5	4	82	15.4	6	15.3	12.9
White	27		3	74		6		
Colored	12	[6]	1	127	[6]	0	[6]	[6]
Kansas City, Mo	107	13.6	10	76	14.8	6	14.7	13.6
Knoxville	37	17.7	3	64	13.2	1	15.0	12.7
White	27		3	71		0		
Colored	10	[6]	0	0	[6]	1	[6]	[6]
Long Beach	33	11.3	2	48	10.1	0	11.7	11.8
Los Angeles	326	12.9	30	87	12.7	20	13.7	13.2
Louisville	107	18.1	3	26	10.8	3	18.4	13.9
White	72		2	20		2		
Colored	35	[6]	1	66	[6]	1	[6]	[6]
Lowell [7]	36	18.6	4	102	17.1	4	14.9	12.6
Lynn	22	11.2	1	26	9.7	2	13.1	10.9
Memphis	101	20.4	20	212	19.3	10	19.0	16.4
White	54		9	150		1		
Colored	47	[6]	11	318	[6]	9	[6]	[6]
Miami	20	9.3	1	25	8.0	2	12.7	11.0
White	12		0	0		1		
Colored	8	[6]	1	88	[6]	1	[6]	[6]
Milwaukee	117	10.3	16	69	9.5	11	9.7	10.3
Minneapolis	109	12.0	15	97	11.1	7	12.7	12.6
Nashville	45	15.1	4	60	14.2	10	16.7	16.1
White	28		3	60		6		
Colored	17	[6]	1	59	[6]	4	[6]	[6]
New Bedford [7]	26	12.0	4	106	9.7	0	13.5	12.3
New Haven	51	16.3	3	57	13.5	1	13.2	14.1
New Orleans	186	20.7	14	77	21.7	30	21.6	20.5
White	102		8	66		16		
Colored	84	[6]	6	98	[6]	14	[6]	[6]
New York	2,243	16.5	174	73	11.6	165	14.7	11.8
Bronx Boro	315	12.3	28	63	8.6	17	10.5	8.1
Broklyn Boro	776	15.4	66	70	10.7	63	13.8	10.9
Manhattan Boro	856	24.6	58	99	16.8	70	22.4	17.6
Queens Boro	250	11.3	21	57	7.9	11	9.7	7.9
Richmond Boro	46	14.7	1	18	15.7	4	14.2	14.1
Newark, N. J	116	13.6	8	42	12.6	9	13.4	13.9
Oakland	68	12.1	7	89	13.0	4	14.0	12.6
Oklahoma City	43	11.4	7	97	13.3	5	11.7	8.8
Omaha	56	13.5	4	45	12.2	2	15.6	12.7
Paterson	33	12.4	2	34	11.3	2	13.3	12.5
Philadelphia	726	19.3	44	64	13.2	36	16.1	12.2

See foot notes at end of table.

Deaths[1] from all causes in certain large cities of the United States during the week ended January 24, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued.

City	Week ended Jan. 24, 1931				Corresponding week, 1930		Death rate[2] for first 4 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1931	1930
Pittsburgh	219	16.9	26	90	15.2	16	16.7	14.1
Portland, Oreg	84	14.3	0	0	14.3	2	14.3	14.3
Providence	71	14.5	11	101	14.8	5	14.6	15.7
Richmond	60	17.0	6	87	18.5	7	16.1	16.3
White	30		1	22		1		
Colored	30	(6)	5	217	(6)	6	(6)	(6)
Rochester	84	13.2	4	36	11.6	7	13.2	11.6
St. Louis	269	16.9	21	71	14.3	8	16.5	14.5
St. Paul	53	10.0	3	31	12.8	2	11.0	12.2
Salt Lake City[5]	32	11.7	1	15	15.9	6	14.7	13.7
San Antonio	78	16.9	16		24.4	20	16.1	20.9
San Diego	50	16.7	4	81	12.9	4	16.9	17.0
San Francisco	203	16.3	10	66	13.9	5	15.6	14.4
Schenectady	22	11.9	2	59	12.0	3	8.9	11.0
Seattle	81	11.4	6	57	8.5	2	13.4	10.2
Somerville	18	8.9	1	37	15.0	4	10.4	12.4
South Bend	23	11.1	3	75	7.9	1	8.0	9.7
Spokane	35	15.7	2	52	12.2	0	14.8	13.2
Springfield, Mass	41	14.0	4	61	10.4	2	12.7	12.7
Syracuse	52	12.7	6	71	11.4	6	13.0	13.4
Tacoma	32	15.5	1	26	12.2	4	15.8	11.2
Toledo	81	14.3	6	55	13.2	5	12.4	13.5
Trenton	33	13.9	2	35	14.4	4	19.3	17.0
Utica	38	19.4	1	26	14.3	2	17.3	16.6
Washington, D. C	178	18.8	13	72	16.5	17	18.3	16.2
White	113		6	49		9		
Colored	65	(6)	7	120	(6)	8	(6)	(6)
Waterbury	24	12.4	3	90	7.8	2	9.9	9.9
Wilmington, Del.[7]	30	14.7	6	129	13.2	4	14.7	13.9
Worcester	59	15.6	4	55	16.3	7	14.7	14.1
Yonkers	29	10.9	2	52	5.8	2	10.4	8.3
Youngstown	31	9.3	5	70	11.9	3	11.1	10.2

[1] Deaths of nonresidents are included Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 76 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended January 31, 1931, and February 1, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended January 31, 1931, and February 1, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan 31, 1931	Week ended Feb. 1, 1930
New England States								
Maine	1	3	26	5	48	1	0	0
New Hampshire	1		10		141	11	0	0
Vermont		2			12		0	0
Massachusetts	93	111	307	7	588	305	2	7
Rhode Island	7	14	21		1	2	0	0
Connecticut	11	25	176	8	242	25	0	2
Middle Atlantic States:								
New York	133	159	[1] 646	[1] 60	418	536	31	10
New Jersey	81	125	967	13	525	274	7	6
Pennsylvania	128	207			1,441	721	9	8
East North Central States.								
Ohio	120	93	72	43	250	692	8	18
Indiana	44	31	68		314	107	6	11
Illinois	153	213	480	25	886	401	8	11
Michigan	53	77	16	11	185	320	5	26
Wisconsin	35	17	111	32	335	878	2	7
West North Central States:								
Minnesota	15	10		1	56	143	0	4
Iowa	13	8		8	3	342	3	2
Missouri	54	39	86	35	830	106	7	15
North Dakota	1	21			25	26	2	3
South Dakota	31				8	98	0	3
Nebraska	13	16	20	31	12	578	1	6
Kansas	11	16	13	16	46	254	4	1
South Atlantic States:								
Delaware	1	3	82	2	8	5	0	0
Maryland [2]	26	20	3,148	53	301	7	0	4
District of Columbia	11	26	52	1	27	4	3	1
Virginia							3	5
West Virginia	15	15	173	46	36	68	0	0
North Carolina [3]	33	40	1,764	25	150	11	0	2
South Carolina	12	16	2,873	966	24		0	3
Georgia [3]	10	16	323	164	52	95	1	12
Florida [3]	3	12	46		65	50	0	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, 1931, 6 cases: 2 cases in Alabama; 2 cases in Georgia; 1 case in Florida; and 1 case in North Carolina.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended January 31, 1931, and February 1, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930
East South Central States:								
Kentucky	19				170	89	7	2
Tennessee	8	5	186	134	64	114	6	11
Alabama [3]	24	19	305	208	529	47	6	1
Mississippi	21	12					6	10
West South Central States:								
Arkansas	3	10	156	228	1	7	1	2
Louisiana	49	45	117	29	2	27	7	1
Oklahoma [5]	39	35	216	164	25	91	0	6
Texas	27	52	107	214	148	114	2	1
Mountain States:								
Montana		1			4	20	1	5
Idaho		2	5		1	30	1	4
Wyoming	1		1	1		34	1	1
Colorado	11	3		1	107	101	4	4
New Mexico	6	11	6	3	38	116	0	0
Arizona	6	5	10	24	72	5	3	6
Utah [3]		1	6	3	3	129	1	2
Pacific States:								
Washington	10	6		2	67	149	3	4
Oregon	11	8	48	111	78	13	0	0
California	57	68	185	44	509	864	4	5

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930
New England States:								
Maine	1	1	37	45	0	0	3	3
New Hampshire	0	0	1	15	1	0	0	0
Vermont	0	0	2	5	6	8	0	0
Massachusetts	1	0	375	283	0	0	4	4
Rhode Island	0	0	29	25	0	0	0	0
Connecticut	0	0	44	97	0	0	0	0
Middle Atlantic States:								
New York	1	0	743	489	3	12	7	17
New Jersey	0	0	292	231	0	0	1	2
Pennsylvania	1	0	656	540	1	1	11	12
East North Central States:								
Ohio	4	1	799	438	87	213	9	7
Indiana	1	0	402	247	105	243	3	1
Illinois	4	0	524	649	66	133	3	7
Michigan	1	0	45	401	53	78	7	3
Wisconsin	1	0	125	132	7	50	5	1
West North Central States:								
Minnesota	1	0	66	142	10	10	7	6
Iowa	2	0	150	110	55	111	0	0
Missouri	2	3	230	104	25	51	3	0
North Dakota	0	2	49	40	11	27	2	0
South Dakota	0	0	17	38	36	19	1	0
Nebraska	1	0	52	95	62	41	0	1
Kansas	1	1	56	145	100	63	1	2
South Atlantic States:								
Delaware	0	0	33	27	0	0	0	0
Maryland [3]	0	0	112	91	0	0	5	3
District of Columbia	0	0	26	16	0	0	1	0
Virginia		1						
West Virginia	0	0	34	40	11	27	7	8
North Carolina [3]	2	0	78	51	2	23	2	1
South Carolina	1	1	15	30	0	3	11	2
Georgia [3]	0	0	60	20	0	0	3	5
Florida [3]	0	1	14	12	0	1	1	1

[3] Week ended Friday.

[4] Typhus fever, 1931, 6 cases: 2 cases in Alabama; 2 cases in Georgia; 1 case in Florida; and 1 case in North Carolina.

[5] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended January 31, 1931, and February 1, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930
East South Central States:								
Kentucky	0	0	150	56	16	19	8	1
Tennessee	0	0	39	26	5	19	5	2
Alabama [3]	0	0	73	37	3	3	7	2
Mississippi	1	0	22	16	11	0	4	1
West South Central States:								
Arkansas	0	0	10	23	9	31	5	4
Louisiana	0	0	31	12	9	7	1	11
Oklahoma [4]	2	0	38	38	109	49	11	3
Texas	0	0	46	70	24	72	6	0
Mountain States:								
Montana	0	0	45	31	2	3	1	0
Idaho	0	1	10	8	1	7	2	1
Wyoming	0	0	26	7	0	23	0	1
Colorado	1	0	45	37	6	32	2	0
New Mexico	0	0	13	4	2	4	4	1
Arizona	1	0	10	17	0	45	2	1
Utah [2]	0	0	13	12	0	3	1	0
Pacific States:								
Washington	0	1	51	66	19	95	1	5
Oregon	0	0	27	61	38	29	1	1
California	6	7	160	341	128	71	7	8

[2] Week ended Friday.
[3] Typhus fever, 1931, 6 cases: 2 cases in Alabama, 2 cases in Georgia, 1 case in Florida, and 1 case in North Carolina.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
December, 1930										
Alabama	12	232	209	99	390	22	2	274	7	44
Montana	3	8	13		9		0	144	85	1
New Mexico	2	46	18		293	1	4	41	4	27
Oklahoma [1]	2	157	187	70	124	3	3	171	112	60
South Dakota	4	46	25	1	12		9	55	98	3
Virginia	11	303	2,520	12	446	28	2	409	3	49
Washington	5	73	41		99		1	230	107	9
Wisconsin	10	72	116		729		13	492	37	13

[1] Exclusive of Oklahoma City and Tulsa.

December, 1930

	Cases
Chicken pox:	
Alabama	206
Montana	237
New Mexico	101
Oklahoma [1]	59
South Dakota	75
Virginia	651
Washington	467
Wisconsin	2,274
Conjunctivitis:	
New Mexico	11
Oklahoma [1]	1

	Cases
Dysentery:	
Montana	1
New Mexico	1
Oklahoma [1]	6
Dysentery and diarrhea:	
Virginia	109
German measles:	
Montana	2
New Mexico	1
Washington	107
Wisconsin	15
Hookworm disease:	
Oklahoma [1]	1

[1] Exclusive of Oklahoma City and Tulsa.

	Cases
Impetigo contagiosa:	
Washington	2
Lethargic encephalitis:	
Alabama	2
Washington	3
Wisconsin	3
Mumps:	
Alabama	57
Montana	88
New Mexico	46
Oklahoma [1]	5
South Dakota	9
Washington	154
Wisconsin	715
Ophthalmia neonatorum:	
Oklahoma [1]	1
South Dakota	1
Wisconsin	1
Puerperal septicemia:	
South Dakota	1
Washington	2
Scabies:	
Washington	14
Septic sore throat:	
Montana	1
Oklahoma [1]	40
Trachoma:	
Montana	55
New Mexico	1
South Dakota	2

	Cases
Trichinosis:	
South Dakota	1
Tularaemia:	
Alabama	1
Montana	2
New Mexico	1
Virginia	20
Wisconsin	5
Typhus fever:	
Alabama	3
Virginia	1
Undulant fever:	
Alabama	5
Virginia	2
Wisconsin	2
Vincent's angina:	
New Mexico	1
Oklahoma [1]	7
Whooping cough:	
Alabama	79
Montana	122
New Mexico	39
Oklahoma [1]	55
South Dakota	54
Virginia	321
Washington	124
Wisconsin	446

Cases of Certain Communicable Diseases Reported for the Month of November, 1930, by State Health Officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	199	24	138	235	93	0	65	66	219
New Hampshire		22			24	0		2	
Vermont	283	22	27	8	26	5	14	2	150
Massachusetts	1,425	268	559	184	677	0	435	38	397
Rhode Island	76	44	5	9	65	0	23	7	55
Connecticut	304	48	296	135	147	0	117	19	185
New York	2,135	374	526	513	1,401	30	1,547	112	1,407
New Jersey	905	258	452	44	539	0	351	34	337
Pennsylvania	2,799	563	1,011	646	1,663	1	591	156	545
Ohio	2,401	320	145	311	1,707	198	539	126	220
Indiana	684	250	350	23	829	233	294	54	104
Illinois	1,694	728	373	757	1,336	96	729	71	491
Michigan	1,352	347	206	252	819	132	395	44	503
Wisconsin	1,894	80	645	477	384	29	167	23	573
Minnesota	671	83	55		244	42	237	26	90
Iowa	342	55	12	45	256	45	24	28	25
Missouri	405	351	1,290	59	511	63	200	124	54
North Dakota	235	47	29	84	80	77	16	22	49
South Dakota	129	33	5	17	47	56	7	13	29
Nebraska	240	57	25	26	100	84	33	4	32
Kansas	342	86	28	50	217	109	124	27	113
Delaware	13	19	4	5	40	0	8	11	8
Maryland	294	138	27	31	254	0	166	93	102
District of Columbia	38	36	14		102	0	71	6	7
Virginia	492	370	483		438	12	137	50	254
West Virginia	317	132	75		287	113	63	130	112
North Carolina	580	510	52		572	0		35	370
South Carolina	181	325	26	70	133		114	123	
Georgia	116	141	40	46	191	0	68	79	55
Florida	28	76	36	13	32	1	40	4	16

[1] Exclusive of Oklahoma City and Tulsa.

Cases of Certain Communicable Diseases Reported for the Month of November, 1930, by State Health Officers—Continued

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Kentucky [1]									
Tennessee	332	318	69	62	380	13	167	135	78
Alabama	176	467	178	31	409	3	313	84	79
Mississippi	322	326	74	113	160	12	193	137	412
Arkansas	57	91	6	22	67	27	[2] 4	113	6
Louisiana	43	152	13	1	89	8	[2] 145	85	24
Oklahoma [3]	47	276	90	4	234	27	44	150	21
Texas		328			164			131	
Montana	280	11	10	61	132	24	36	6	111
Idaho	33	11	30	5	48	10	7	5	38
Wyoming	79	3	1	11	21	0	[2] 1	2	33
Colorado	282	72	249	134	136	43	88	25	81
New Mexico	54	27	55	14	16	0	54	23	2
Arizona	26	26	202	9	11	2	133	4	34
Utah [1]									
Nevada	5		2	14		2	3	0	33
Washington	305	89	66	125	180	89	111	30	139
Oregon	223	18	194	106	86	65		21	66
California	902	316	529	617	408	86	728	61	426

[1] Reports received weekly.
[2] Pulmonary.
[3] Exclusive of Oklahoma City and Tulsa.

Case Rates per 1000 Population (Annual Basis) for the Month of November, 1930, Based on Provisional Populations

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	3.02	0.36	2.10	3.57	1.41	.00	0.99	1.00	3.33
New Hampshire		.57			.63	.00		.05	
Vermont	9.58	.75	.91	.27	.88	.17	.47	.07	5.08
Massachusetts	4.07	.76	1.60	.53	1.93	.00	1.24	.11	1.13
Rhode Island	1.34	.78	.09	.16	1.15	.00	.41	.12	.97
Connecticut	2.30	.36	2.24	1.02	1.11	.00	.88	.14	1.40
New York	2.05	.36	.50	.49	1.34	.03	1.49	.11	1.35
New Jersey	2.72	.78	1.36	.13	1.62	.00	1.05	.10	1.01
Pennsylvania	3.52	.63	1.27	.81	2.09	.00	.67	.20	.69
Ohio	4.38	.58	.26	.57	3.12	.36	.98	.23	.40
Indiana	2.57	.94	1.32	.09	3.12	.88	.88	.20	.39
Illinois	2.70	1.16	.59	1.21	2.13	.15	1.15	.11	.78
Michigan	3.38	.87	.51	.63	2.05	.33	.99	.11	1.26
Wisconsin	7.84	.33	2.67	1.98	1.59	.12	.69	.10	2.37
Minnesota	3.18	.39	.26		1.15	.20	1.12	.12	.47
Iowa	1.69	.27	.06	.22	1.26	.22	.12	.11	.12
Missouri	1.36	1.18	4.33	.20	1.71	.21	.67	.42	.18
North Dakota	4.18	.84	.52	1.50	1.42	1.37	.28	.39	.87
South Dakota	2.14	.58	09	.30	.83	.98	.12	.23	.51
Nebraska	2.11	.50	.22	.23	.88	.74	.29	.04	.29
Kansas	2.21	.55	.18	.32	1.40	.67	.80	.17	.73
Delaware	.66	.97	.20	.25	2.50	.00	.41	.56	.41
Maryland	2.19	1.03	.20	.23	1.89	.00	1.24	.69	.76
District of Columbia	.95	.90	35		2.54	.00	1.77	.15	.17
Virginia	2.47	1.86	2.43		2.20	.06	.69	.25	1.28
West Virginia	2.22	.93	.53		2.01	.79	.44	.97	.79
North Carolina	2.22	1.95	.20		2.19	.02		.13	1.41
South Carolina	1.27	2.28	.18	.49	.93	.00	.80	.86	
Georgia	.49	.59	.17	.19	.80	.00	.29	.33	.23
Florida	.19	.63	.30	.11	.26	.01	.33	.03	.13

Case Rates per 1000 Population (Annual Basis) for the Month of November, 1930, Based on Provisional Populations—Continued

State	Chicken pox	Diphtheria	Mealses	Mumps	Scarlet fever	Small-pox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Kentucky [1]									
Tennessee	1.54	1.48	.32	.29	1.77	.06	.78	.63	.36
Alabama	.81	2.14	.82	.14	1.88	.01	1.44	.39	.36
Mississippi	1.95	1.97	.45	.68	1.02	.07	1.17	.83	2.49
Arkansas	.37	.60	.04	.14	.44	.18	[2] .03	.74	.04
Louisiana	.25	.88	.08	.01	.52	.05	[2] .84	.49	.14
Oklahoma [3]	.28	1.62	.53	.02	1.38	.16	.26	.88	.12
Texas		.68			.34			.27	
Montana	6.35	.25	.23	1.38	2.99	.54	.82	.14	2.52
Idaho	90	.30	.82	.14	1.31	.27	.19	.14	1.04
Wyoming	4.27	.16	.05	.59	1.13	.00	[2] .05	.11	1.78
Colorado	3.31	.84	2.92	1.57	1.60	.50	1.03	.29	.95
New Mexico	1.53	.77	1.56	.40	.45	.00	1.53	.65	.06
Arizona	.72	.72	5.61	.25	.31	.06	3.69	.11	.94
Utah [1]									
Nevada	.67		.27	1.87		.27	.40	.00	4.40
Washington	2.37	.69	.51	.97	1.40	.69	.86	.23	1.08
Oregon	2.84	.23	2.47	1.35	1.09	83		.27	.84
California	1.92	.67	1.12	1.31	87	.18	1.55	.13	.91

[1] Reports received weekly.
[2] Pulmonary
[3] Exclusive of Oklahoma City and Tulsa.

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of December, 1930, by departments of health of certain States to other State health departments

Disease	California	Connecticut	Kansas	Massachusetts	Minnesota	New Jersey	New York	Oregon
Diphtheria		1					2	
Measles							1	
Paratyphoid fever							1	
Poliomyelitis					1			
Syphilis			19		2			
Tuberculosis	2				33			7
Typhoid fever				2		1	1	
Undulant fever		1					1	

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,350,000. The estimated population of the 89 cities reporting deaths is more than 31,805,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended January 24, 1931, and January 25, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,335	1,595	
96 cities	508	696	988
Measles:			
45 States	7,992	6,762	
96 cities	2,582	1,387	
Meningococcus meningitis:			
46 States	132	239	
96 cities	60	92	
Poliomyelitis: 47 States	49	20	
Scarlet fever:			
46 States	5,458	5,031	
96 cities	2,132	1,817	1,474
Smallpox:			
46 States	995	1,755	
96 cities	103	162	55
Typhoid fever:			
46 States	148	173	
96 cities	40	26	32
Deaths reported			
Influenza and pneumonia: 89 cities	1,712	963	
Smallpox: 89 cities	0	0	

City reports for week ended January 24, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	13	1	0	1	0	0	11	3
New Hampshire:								
Concord	0	0	0		0	0	0	1
Nashua	0	0	0		0	0	0	0
Vermont:								
Barre	3	0	0		0	0	2	0
Burlington	1	0	3		0	0	0	0
Massachusetts:								
Boston	80	35	31	66	3	86	12	41
Fall River	4	4	4		0	0	10	2
Springfield	15	5	1		0	2	6	2
Worcester	14	5	4	26	1	1	1	7
Rhode Island:								
Pawtucket	15	1	2		0	0	0	0
Providence	5	10	1	1	0	0	0	7
Connecticut:								
Bridgeport	1	6	0	1	1	2	2	2
Hartford	2	6	1	10	0	103	0	4
New Haven	18	1	0	18	0	23	29	5

City reports for week ended January 24, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MIDDLE ATLANTIC								
New York:								
Buffalo	44	13	14	...	0	49	48	22
New York	171	208	78	1, 140	147	161	17	508
Rochester	12	8	2	...	1	2	3	7
Syracuse	28	3	1	...	0	8	0	5
New Jersey:								
Camden	3	7	1	5	3	77	2	5
Newark	48	21	18	191	6	6	6	18
Trenton	10	3	0	88	1	0	3	2
Pennsylvania:								
Philadelphia	140	71	24	104	44	74	19	128
Pittsburgh	93	23	9	2	2	26	12	46
Reading	18	2	2	...	0	159	41	2
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	19	10	0	1	2	38	25	17
Cleveland	184	31	15	26	3	1	100	19
Columbus	18	4	1	1	1	3	4	6
Toledo	67	8	9	1	1	2	18	4
Indiana:								
Fort Wayne	7	5	5	...	0	16	0	4
Indianapolis	54	10	0	...	2	10	12	15
South Bend	5	1	0	...	0	0	0	6
Terre Haute	7	1	0	...	0	0	0	1
Illinois:								
Chicago	113	110	99	226	19	26	39	95
Springfield	...	1	...	...	...	...	...	...
Michigan:								
Detroit	115	56	31	12	1	7	15	19
Flint	12	3	0	...	0	1	5	3
Grand Rapids	7	2	0	...	1	0	0	2
Wisconsin:								
Kenosha	40	1	0	...	0	0	9	1
Madison	30	0	1	...	0	1	24	...
Milwaukee	110	17	1	...	0	18	194	14
Racine	25	2	0	...	0	0	0	1
Superior	6	0	1	...	0	0	0	1
WEST NORTH CENTRAL								
Minnesota:								
Duluth	0	0	0	...	0	0	0	2
Minneapolis	54	23	3	...	2	13	30	15
St. Paul	31	7	0	...	3	1	3	3
Iowa:								
Davenport	1	1	0	...	...	0	0	...
Des Moines	5	2	1	...	...	0	0	...
Sioux City	8	0	1	...	...	1	5	...
Waterloo	8	1	0	...	...	1	0	...
Missouri:								
Kansas City	37	6	8	1	1	34	2	21
St. Joseph	1	3	1	...	3	0	2	4
St. Louis	26	43	26	1	...	983	5	...
North Dakota:								
Fargo	15	0	0	...	0	...	7	0
Grand Forks	1	1	1	...	...	0	4	...
South Dakota:								
Sioux Falls	0	1	0	...	...	0	0	...
Nebraska:								
Omaha	5	5	4	...	0	0	4	9
Kansas:								
Topeka	14	2	0	2	1	3	0	3
Wichita	10	2	1	...	0	1	0	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	4	2	2	...	0	3	0	6
Maryland:								
Baltimore	188	26	8	1, 046	10	108	16	38
Cumberland	1	1	0	2	0	0	0	1
Frederick	6	0	0	...	0	1	0	0
District of Columbia:								
Washington	35	19	10	28	2	25	0	26
Virginia:								
Lynchburg	5	1	1	...	0	0	0	3
Norfolk	12	3	2	882	0	0	0	11
Richmond	10	5	4	42	2	91	1	9
Roanoke	7	3	0	...	0	0	0	5

City reports for week ended January 24, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
SOUTH ATLANTIC—con.								
West Virginia:								
Charleston	8	2	0	4	2	0	4	8
Wheeling	25	2	0		0	2	0	2
North Carolina:								
Raleigh	11	1	0		0	1	0	2
Wilmington	47	1	1		0	1	0	8
Winston-Salem	9	1	0	45	2	1	0	12
South Carolina:								
Charleston	1	2	1	198	0	12	1	7
Columbia		0						
Greenville	1	0	0	0	0	0	0	0
Georgia:								
Atlanta	7	5	3	53	0	59	0	16
Brunswick	0	0	0		0	0	0	1
Savannah	0	1	2	21	1	0	0	4
Florida:								
Miami	10	2	3		0	0	1	0
Tampa	0	2	0		0	5	0	1
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	1	1		0	1	0	2
Tennessee:								
Memphis	36	5	4		3	8	1	16
Nashville	2	2	0		2	10	0	8
Alabama:								
Birmingham	10	3	7	5	4	101	0	16
Mobile	0	2	1		1	0	0	5
Montgomery	9	1	0	1		0	1	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	1	0	0			0	0	
Little Rock	13	2	1		0	0	0	4
Louisiana:								
New Orleans	3	15	9	12	12	0	0	26
Shreveport	0	2	0		0	0	0	3
Oklahoma:								
Muskogee	0	0	1	3	0	0	0	0
Oklahoma City	0	2	0		0	0	0	8
Texas:								
Dallas	19	8	2	1	2	3	3	13
Fort Worth	13	4	7		0	0	0	6
Galveston	1	1	2		0	0	0	3
Houston	7	8	6		2	0	0	10
San Antonio	3	2	4		8	0	0	12
MOUNTAIN								
Montana:								
Billings	0	0	0		0	0	0	0
Great Falls	4	0	0		0	0	0	0
Helena	3	0	0		0	0	0	0
Missoula	0	1	0	1	1	0	0	2
Idaho:								
Boise	1	0	0		0	0	0	0
Colorado:								
Denver	43	9	2		3	9	26	10
Pueblo	7	1	0		1	78	1	3
New Mexico:								
Albuquerque	0	1	0		0	0	1	1
Arizona:								
Phoenix	0	0	3		0	1	0	6
Utah:								
Salt Lake City	13	4	2		0	0	5	2
Nevada:								
Reno	0	0	0		0	0	0	1
PACIFIC								
Washington:								
Seattle	22	4	3			0	27	
Spokane	35	2	2			18	1	
Tacoma	13	4	11		0	0	1	3
Oregon:								
Portland	16	10	2	2	1	13	3	9
Salem	0	1	0		0	16	11	0
California:								
Los Angeles	61	43	15	49	6	15	13	26
Sacramento	25	2	7		0	1	3	8
San Francisco	42	15	7	12	3	3	6	6

City reports for week ended January 24, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases, reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases, reported	Smallpox: Deaths, reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases, reported	Typhoid fever: Deaths, reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine											
Portland	4	14	0	0	0	0	0	0	0	22	44
New Hampshire.											
Concord	1	0	0	0	0	2	0	0	0	0	15
Nashua	0	0	0	0	0	0	0	0	0	0	-------
Vermont.											
Barre	0	0	0	0	0	4	0	0	0	7	6
Burlington	1	0	0	0	0	0	0	0	0	0	10
Massachusetts.											
Boston	82	117	0	0	0	15	1	1	0	43	270
Fall River	5	18	0	0	0	0	0	0	0	3	22
Springfield	9	8	0	0	0	0	0	0	0	8	32
Worcester	11	22	0	0	0	1	0	0	0	9	59
Rhode Island											
Pawtucket	1	14	0	0	0	0	0	0	0	0	13
Providence	13	34	0	0	0	0	0	0	0	3	71
Connecticut											
Bridgeport	10	4	0	0	0	3	1	0	0	6	37
Hartford	7	7	0	0	0	1	0	0	0	4	41
New Haven	8	1	0	0	0	4	0	0	0	1	51
MIDDLE ATLANTIC											
New York											
Buffalo	27	38	0	0	0	3	1	0	0	26	153
New York	241	288	0	0	0	103	7	2	0	130	2,243
Rochester	9	93	0	0	0	4	0	0	0	42	82
Syracuse	14	14	0	0	0	1	1	0	0	5	52
New Jersey											
Camden	7	11	0	0	0	2	0	0	0	0	39
Newark	39	25	0	0	0	2	1	2	0	21	105
Trenton	5	13	0	0	0	5	0	0	0	0	33
Pennsylvania											
Philadelphia	101	168	0	0	0	35	2	2	0	24	726
Pittsburgh	36	48	0	0	0	7	1	1	0	21	219
Reading	4	4	0	0	0	1	0	0	0	0	20
EAST NORTH CENTRAL											
Ohio											
Cincinnati	23	34	1	0	0	2	0	0	0	0	136
Cleveland	45	79	1	0	0	13	1	2	0	34	182
Columbus	11	4	1	1	0	3	0	0	0	0	80
Toledo	14	15	1	5	0	7	0	0	0	3	81
Indiana											
Fort Wayne	6	6	1	0	0	0	0	0	0	2	22
Indianapolis	10	52	4	23	0	7	0	0	0	18	-------
South Bend	3	2	0	0	0	1	0	0	0	4	23
Terre Haute	4	3	0	0	0	0	0	0	0	0	21
Illinois.											
Chicago	136	266	1	6	0	53	3	2	1	55	768
Springfield	3	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Michigan											
Detroit	110	121	2	2	0	27	1	0	0	81	264
Flint	13	16	1	0	0	2	0	1	0	13	27
Grand Rapids	12	14	0	3	0	0	0	0	0	1	40
Wisconsin											
Kenosha	2	3	0	0	0	0	0	0	0	0	9
Madison	4	6	0	0	-------	-------	0	0	-------	6	-------
Milwaukee	37	20	0	0	0	5	0	0	0	28	117
Racine	6	5	0	0	0	0	0	0	0	1	15
Superior	3	0	0	0	0	0	0	0	0	0	6
WEST NORTH CENTRAL											
Minnesota:											
Duluth	11	6	3	0	0	1	0	0	0	1	28
Minneapolis	51	19	0	0	0	0	0	1	0	15	109
St. Paul	32	2	0	0	0	3	0	1	0	6	55
Iowa:											
Davenport	2	2	1	6	-------	-------	0	0	-------	0	-------
Des Moines	11	10	2	4	-------	-------	0	0	-------	0	36
Sioux City	1	16	0	1	-------	-------	0	0	-------	0	-------
Waterloo	2	0	1	1	-------	-------	0	0	-------	0	-------

City reports for week ended January 24, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases, reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases, reported	Smallpox: Deaths, reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases, reported	Typhoid fever: Deaths, reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—contd.											
Missouri:											
Kansas City	19	8	1	1	0	3	0	0	0	5	107
St. Joseph	2	6	0	0	0	0	0	0	0	0	34
St. Louis	37	91	1	3	0	11	0	2	0	4	269
North Dakota:											
Fargo	3	1	1	0	0	0	0	1	0	2	9
Grand Forks	0	1	0	0	-------	-------	0	0	-------	0	-------
South Dakota:											
Sioux Falls	2	1	0	7	-------	-------	0	0	-------	0	8
Nebraska:											
Omaha	5	15	1	16	0	1	0	0	0	7	56
Kansas:											
Topeka	2	3	0	0	0	1	0	0	0	0	15
Wichita	4	2	1	18	0	3	0	0	1	6	33
SOUTH ATLANTIC											
Delaware:											
Wilmington	6	18	0	0	0	1	0	0	0	1	30
Maryland:											
Baltimore	36	37	0	0	0	18	1	1	0	24	248
Cumberland	1	5	0	0	0	0	0	1	0	0	13
Frederick	0	4	0	0	0	0	0	0	0	0	5
District of Col.:											
Washington	25	32	0	0	0	15	0	1	0	5	178
Virginia:											
Lynchburg	1	0	0	0	0	1	0	0	0	0	11
Norfolk	3	1	0	0	0	1	0	0	0	9	-------
Richmond	5	14	0	0	0	5	0	0	0	1	52
Roanoke	1	2	1	0	0	1	0	0	0	0	19
West Virginia:											
Charleston	2	0	0	1	0	0	0	2	0	1	18
Wheeling	2	3	0	0	0	0	0	0	0	0	15
North Carolina:											
Raleigh	1	0	1	0	0	0	0	0	0	8	14
Wilmington	0	0	0	1	0	1	0	0	0	9	12
Winston-Salem	3	3	1	0	0	1	0	0	0	0	35
South Carolina:											
Charleston	1	3	0	0	0	1	0	0	0	0	25
Columbia	0	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Greenville	0	2	0	0	0	0	0	0	0	0	-------
Georgia:											
Atlanta	5	33	2	0	0	0	0	1	1	1	74
Brunswick	0	0	0	0	0	0	0	0	0	0	5
Savannah	1	10	0	0	0	0	1	0	0	0	30
Florida:											
Miami	2	0	0	0	0	2	0	0	0	5	20
Tampa	1	6	0	0	0	5	1	1	0	0	31
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	25	1	0	0	3	0	0	0	0	27
Tennessee:											
Memphis	7	39	2	5	0	2	1	2	0	0	101
Nashville	2	9	0	0	0	4	1	0	0	2	45
Alabama:											
Birmingham	4	9	1	0	0	4	0	0	0	3	82
Mobile	2	1	0	0	0	3	0	0	0	0	25
Montgomery	2	0	0	0	-------	-------	1	0	-------	2	-------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	3	0	0	-------	-------	0	0	-------	0	-------
Little Rock	2	4	0	0	0	1	0	0	0	0	-------
Louisiana:											
New Orleans	8	22	0	3	0	8	3	1	1	2	186
Shreveport	1	0	0	0	0	1	0	0	0	0	29

City reports for week ended January 24, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases, reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases, reported	Smallpox: Deaths, reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases, reported	Typhoid fever: Deaths, reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL—contd.											
Oklahoma:											
Muskogee	1	0	2	0	0	0	0	0	0	0	-------
Oklahoma City	3	5	1	5	0	4	0	0	0	0	43
Texas:											
Dallas	6	4	2	0	0	3	0	1	1	3	71
Fort Worth	2	4	1	0	0	1	1	0	0	3	39
Galveston	1	1	0	0	0	1	0	5	0	0	15
Houston	4	8	2	7	0	3	0	1	0	0	76
San Antonio	3	0	1	0	0	9	0	0	0	0	78
MOUNTAIN											
Montana:											
Billings	2	0	0	0	0	1	0	0	0	3	6
Great Falls	3	7	2	0	0	0	0	0	0	11	4
Helena	0	0	0	1	0	0	0	0	0	0	9
Missoula	1	0	0	0	0	1	0	0	0	0	10
Idaho:											
Boise	2	0	0	0	0	0	0	0	0	1	7
Colorado:											
Denver	12	31	0	0	0	8	0	0	0	17	92
Pueblo	2	0	0	0	0	0	1	1	0	7	13
New Mexico:											
Albuquerque	1	2	0	0	0	3	0	0	0	0	11
Arizona:											
Phoenix	0	1	0	0	0	4	0	0	0	0	-------
Utah:											
Salt Lake City	5	3	1	0	0	2	0	1	0	13	32
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	5
PACIFIC											
Washington:											
Seattle	10	15	2	0	-------	-------	1	1	-------	26	-------
Spokane	10	8	5	5	-------	-------	0	0	-------	2	-------
Tacoma	3	3	4	1	0	2	0	0	0	4	32
Oregon:											
Portland	5	2	9	10	0	4	0	0	0	0	84
Salem	0	0	1	0	0	0	0	0	0	0	-------
California:											
Los Angeles	41	24	4	1	0	29	1	2	0	9	326
Sacramento	2	0	1	1	0	1	0	0	0	7	36
San Francisco	22	11	2	2	0	15	1	0	0	27	222

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Massachusetts:									
Boston	3	1	1	0	0	0	1	0	1
Worcester	0	0	0	0	0	0	0	1	0
Connecticut:									
Hartford	1	1	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
New York	15	11	5	2	0	0	1	0	0
New Jersey:									
Newark	3	0	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	2	2	1	0	0	0	0	0	0
Pittsburgh	4	1	1	2	0	0	0	1	0

City reports for week ended January 24, 1931—**Continued**

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	4	0	0	0	0	0	0	0	0
Cleveland	1	2	0	0	0	0	0	0	0
Indiana:									
Indianapolis	1	1	0	0	0	0	0	0	0
Terre Haute	1	1	0	0	0	0	0	0	0
Illinois:									
Chicago	4	2	0	0	1	1	0	0	0
Michigan:									
Detroit	1	1	0	0	0	0	1	1	0
Flint	1	0	0	0	0	0	0	0	0
Wisconsin:									
Milwaukee	1	0	0	0	0	0	0	0	0
Racine	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	1	0	0	0	0	0	0	0	0
St. Paul	0	0	0	0	0	0	0	1	0
Iowa:									
Waterloo	1	0	0	0	0	0	0	0	0
Missouri:									
Kansas City	1	0	0	0	0	0	0	1	0
St. Louis	1	0	0	0	0	0	0	0	0
North Dakota:									
Grand Forks	0	0	0	0	0	0	0	1	0
Nebraska:									
Omaha	1	0	0	0	0	0	0	0	0
SOUTH ATLANTIC									
District of Columbia:									
Washington	1	1	0	0	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	1	0	0	0	0
South Carolina:									
Charleston	0	0	0	0	4	0	0	0	0
Georgia:[1]									
Atlanta	0	0	0	0	3	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	5	3	0	0	0	0	0	0	0
Alabama:									
Birmingham	4	2	1	1	0	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	1	2	0	0	2	2	0	0	0
Shreveport	0	0	0	0	0	1	0	0	0
Oklahoma:									
Muskogee	0	0	0	0	1	0	0	0	0
Texas:									
Dallas	0	0	0	0	1	1	0	0	0
MOUNTAIN									
Idaho:									
Boise	1	0	0	0	0	0	0	0	0
Colorado:									
Denver	0	1	0	0	0	0	0	0	0
Arizona:									
Phoenix	1	5	0	0	0	0	0	0	0
PACIFIC									
California:									
Los Angeles	1	3	0	0	0	0	0	0	0
Sacramento	0	1	0	0	0	0	0	0	0
San Francisco	0	0	1	0	0	0	0	4	2

[1] Typhus fever: 1 case at Savannah, Ga.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended January 24, 1931, compared with those for a like period ended January 25, 1930. The population figures used in computing the rates previous to 1931 are approximate estimates. Those used in computing the rates for the weeks ended January 3 and January 4, and subsequent weeks, are estimated midyear populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities December 21, 1930, to January 24, 1931.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929–30 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Dec. 27, 1930	Dec 28, 1929	Jan. 3, 1931	Jan. 4 1930	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930
98 cities	73	120	78	113	81	114	74	108	[2] 79	110
New England	69	126	115	141	76	162	91	133	106	160
Middle Atlantic	49	113	67	81	62	107	56	89	67	91
East North Central	103	167	89	153	97	130	95	126	[3] 94	144
West North Central	53	67	82	116	98	126	82	110	84	83
South Atlantic	79	79	61	94	83	90	69	112	[4] 65	116
East South Central	94	109	70	102	116	72	70	60	76	66
West South Central	153	171	132	181	142	153	108	192	81	146
Mountain	60	35	61	53	35	70	52	53	35	35
Pacific	47	82	53	99	61	73	47	81	88	79

MEASLES CASE RATES

	Dec. 27, 1930	Dec 28, 1929	Jan. 3, 1931	Jan. 4 1930	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930
98 cities	185	91	276	126	350	171	324	203	[2] 404	220
New England	279	90	267	129	469	116	310	172	522	230
Middle Atlantic	74	51	99	72	177	109	158	117	251	111
East North Central	28	97	54	117	63	152	87	150	[3] 74	135
West North Central	1,250	146	1,871	283	2,156	310	1,829	372	1,984	467
South Atlantic	114	30	318	144	429	128	500	182	[4] 804	172
East South Central	364	0	896	6	861	12	995	36	698	24
West South Central	26	88	24	91	20	293	7	373	10	582
Mountain	223	78	313	203	226	150	374	247	757	220
Pacific	19	326	24	261	33	413	55	579	72	626

SCARLET FEVER CASE RATES

	Dec. 27, 1930	Dec 28, 1929	Jan. 3, 1931	Jan. 4 1930	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930
98 cities	227	216	227	242	277	264	316	272	[2] 333	288
New England	323	299	325	391	414	411	539	397	575	457
Middle Atlantic	200	165	226	175	249	218	282	212	314	226
East North Central	288	311	255	341	363	350	398	394	[3] 383	375
West North Central	241	179	235	254	206	221	321	265	323	314
South Atlantic	163	144	259	202	276	218	304	216	[4] 343	192
East South Central	385	75	291	114	396	96	465	90	483	149
West South Central	64	122	105	80	68	129	129	125	142	98
Mountain	369	322	218	388	322	493	331	344	357	379
Pacific	99	246	71	225	72	241	72	237	119	344

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1931, 1930, and 1929, respectively.
[2] Springfield, Ill., and Columbia, S. C., not included.
[3] Springfield, Ill., not included.
[4] Columbia, S. C., not included.

Summary of weekly reports from cities December 21, 1930, to January 24, 1931.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929–30—Continued

SMALLPOX CASE RATES

	Week ended—									
	Dec. 27, 1930	Dec. 28, 1929	Jan. 3, 1931	Jan. 4, 1930	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930
98 cities	7	18	7	19	13	30	16	32	[2] 16	26
New England	0	0	0	0	0	0	0	0	0	5
Middle Atlantic	0	0	0	0	0	0	0	0	0	1
East North Central	3	20	5	16	15	27	10	36	[3] 21	19
West North Central	42	58	46	81	63	91	98	124	77	72
South Atlantic	0	2	0	2	2	0	0	6	[4] 4	2
East South Central	0	7	0	0	6	6	17	0	29	0
West South Central	19	27	17	14	37	66	27	38	34	35
Mountain	34	44	9	53	9	44	78	53	9	26
Pacific	24	77	10	89	18	146	29	123	20	152

TYPHOID FEVER CASE RATES

	Dec. 27, 1930	Dec. 28, 1929	Jan. 3, 1931	Jan. 4, 1930	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930
98 cities	7	4	5	3	4	3	5	5	[2] 6	4
New England	2	2	2	2	5	0	0	5	2	0
Middle Atlantic	3	3	4	1	2	3	2	3	3	5
East North Central	13	1	4	2	2	2	2	2	[3] 3	2
West North Central	6	2	2	0	0	2	4	12	10	2
South Atlantic	15	9	4	6	10	10	10	6	[4] 14	8
East South Central	20	34	47	6	12	6	52	12	12	18
West South Central	0	8	3	0	20	3	14	7	27	3
Mountain	9	0	17	9	17	0	9	62	17	9
Pacific	7	10	6	8	2	4	2	4	6	2

INFLUENZA DEATH RATES

	Dec. 27, 1930	Dec. 28, 1929	Jan. 3, 1931	Jan. 4, 1930	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930
91 cities	12	19	16	16	24	18	36	19	[2] 52	21
New England	2	9	7	7	5	0	10	10	12	10
Middle Atlantic	11	13	17	9	28	13	59	14	91	14
East North Central	8	13	7	15	12	12	9	17	[3] 18	17
West North Central	9	15	3	27	21	30	18	27	20	18
South Atlantic	22	26	20	20	28	34	41	24	[4] 38	34
East South Central	22	30	25	26	44	58	63	39	63	52
West South Central	34	94	90	71	76	57	79	60	83	103
Mountain	0	26	17	18	44	44	35	26	44	9
Pacific	21	19	10	10	22	12	10	12	22	15

PNEUMONIA DEATH RATES

	Dec. 27, 1930	Dec. 28, 1929	Jan. 3, 1931	Jan. 4, 1930	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930
91 cities	129	143	160	165	185	160	219	151	[2] 229	140
New England	109	94	159	169	108	176	159	126	178	138
Middle Atlantic	132	155	182	170	231	181	311	159	332	128
East North Central	95	116	101	114	110	121	124	108	[3] 125	110
West North Central	115	174	177	197	200	153	212	209	171	180
South Atlantic	159	152	227	240	243	192	237	186	[4] 280	214
East South Central	184	194	202	227	265	123	227	142	206	194
West South Central	203	234	186	295	238	189	228	221	245	288
Mountain	189	209	261	185	244	229	270	256	157	220
Pacific	166	104	130	92	134	120	118	137	103	77

[2] Springfield, Ill., and Columbia, S. C., not included.
[3] Springfield, Ill., not included.
[4] Columbia, S. C., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended January 24, 1931.—The Department of Pensions and National Health reports cases of certain communicable diseases in Canada for the week ended January 24, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia [1]						
New Brunswick [1]						
Quebec	1					4
Ontario		25	1	1	3	17
Manitoba						7
Saskatchewan					6	
Alberta					7	
British Columbia		38				1
Total	1	63	1	1	16	29

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended January 24, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended January 24, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	2	Ophthalmia neonatorum	3
Chicken pox	114	Scarlet fever	107
Diphtheria	47	Smallpox	2
Erysipelas	11	Tuberculosis	39
German measles	8	Typhoid fever	4
Measles	52	Whooping cough	52
Mumps	172		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Week ended— November, 1930: 22	29	December, 1930: 6	13	20	27	January, 1931: 3	10	17	24	31
Afghanistan	C	P														
China:																
Amoy	C		2													
	D		2													
Canton	C			1	1											
Shanghai	C		34	38	2											
	D		3	4												
Shensi Province	C		P													
Swatow	C	3	2													
Tientsin	C	2	1													
India	C	42, 893	51, 551	36, 529	18, 944	3, 166										
	D	22, 358	23, 959	17, 635	9, 782	1, 616										
Bassein	C		1													
Bombay	C	14	1	16	19	2	2	4	5					20		
	D	8	2	11	17	2	1	1	3					6		
Calcutta	C	63	27	24	33	4	6	2	10	9	7	6	6			
	D	30	12	15	16	4	4	1	7	6	4	5	5			
Madras	C	1		2	1					14	44	70				
	D	1		2						8	12	19	28			
Rangoon	C	1	2	1							1					
	D	1	1	1							1					
Tuticorin	C			1	1	4		1		1						
	D			1	1											
India (French):																
Chandernagor	C		1	3	1		1									
	D			1						1						
Pondicherry	C			1	1	1	1	1	1	3	9					
	D			1		1	1	1	1	3	3					
India (Portuguese)	C	1	1		14											
	D		1		9											

Indo-China (see also table below):																
Pnompenh	C	11		2	1		1	1							1	
	D	6					1	1								
Saigon and Cholon	C	5		2	1		1		2	1		4	4	4		
	D	1					1					2	2	2		
Philippine Islands:[1]																
Ports—																
Cebu	C	9	2													
	D	8	2													
Iloilo	C	64	10	1			1					1				2
	D	56	14	4			3					1				2
Manila	C	1	43	5												
	D		12	1												
Provinces—																
Antique	C	20	47	40												
	D	12	34	18												
Bohol	C	138	49													
	D	79	20													
Bulacan	C	1	4	2												
	D		2	1												
Capiz	C	2	1													3
	D	2														2
Cebu	C	85	25													
	D	50	11													
Iloilo	C	571	238	50	30	11	21	13		7	5	13	3	11	41	36
	D	376	151	40	23	8	11	8		6	4	10	2	9	27	25
Masbate	C	34														
	D	14														
Negros, Occidental	C	343	122	28	56	44	38	48	33	28	19	33	40	19	32	33
	D	237	91	20	41	33	17	45	25	22	16	26	33	15	17	19
Negros, Oriental	C	8														
	D	4														
Pampanga	C		1													
Pangasinan	C	1														
	D	1														
Samar	C	18	4	7	16	4	4			2		12	2			
	D	16	2	7	12	4	4			1	1	7	1			
Sorsogon	C				5											
	D				4											
Surigao	C	28	1	(2)												
	D	17	2													
Tarlac	C	1														
Siam	C	3		4	4	2	1	1	2			2	1			
	D	2		1	4	2	1	1	2			2	1			
Bangkok	C	1		3	3	2	1		1	2	1	1	2			
	D	1		2	2	2	1		1	2	1	1	1			
On vessel: S. S. Malwa from Shanghai	D		1													

[1] Figures for cholera in the Philippine Islands are subject to correction.
[2] During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, P. I.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		June, 1930	July, 1930	August, 1930	September, 1930			October, 1930			November, 1930			Dec. 1-10, 1930
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30	
Indo-China (French) (see also table above):														
Annam [1]	C	16	1	3										
Cambodia [1]	C	144	43	59	23	13	2	16		6		1		28
Cochin-China [1]	C	273	46	27	9	6	18	14	6	8		5		8

[1] Reports incomplete.

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		July, 27-Aug 23, 1930	Aug. 24-Sept. 20, 1930	Sept. 21-Oct. 18, 1930	Week ended— Oct. 25, 1930	November, 1930					December, 1930				January, 1931				
						1	8	15	22	29	6	13	20	27	3	10	17	24	31
Algeria:																			
Algiers	C	7	11	6	5	3	1	2			1	1	1				1		
	D				3														
Constantine	C						1							3	1	1			
Oran	C	4	10	10	1			1											
	D		1	3				1											
Plague-infected rats			10	6	1														
Philippeville	C		1	3	1		1									1			
Argentina:																			
Cordoba Province—Chazon	C											1						1	
Jujuy Province—Palpala	C																		1
Belgian Congo	C	2	5					1				1							
	D	2	3					1				1							

British East Africa (see also table below):																			
Tanganyika	C										3		2						
	D										3		2						
Uganda	C	236	202	165	53	37	34	47	37	17	33								
	D	229	101	164	53	36	33	46	37	18	33								
Canary Islands: Las Palmas	D	1																	
Ceylon: Colombo	C	2	2	3				1	1		4	4	4		4	1	1		
	D	2	3	3				1	1		3	4	4		4	1			
Plague-infected rats								1	1	1									
China:																			
Manchuria—Tungliau and Nungan	C	30	29	2															
Shensi	C		P		P														
Dutch East Indies:																			
Batavia and West Java	C	83	79	107	41	36	27	39	53	56	41	58							
	D	83	76	103	42	37	28	39	53	56	39	58							
Plague-infected rats		1	3																
Java and Madura	D	188	260	335	124	140	107	130	137	127	132	161	159						
Egypt:																			
Alexandria	C	11	10	9	2	1	1	3		1	1	2	1	1		1			
	D	6	8	6	3		2	2				1							
Assiout	C						3			2		7	5	1		1	2		
	D						1					1				1	2		
Aswan	C									3									
Beni-Suef	C	1															1		
Deirout	C																	19	2
	D																	2	2
Gharbieh	C	3																	1
	D	1																	1
Girga	C		1										3	1	3				
	D													1	1				
Manfalut	C															23	5	21	4
	D															5	2	3	1
Minieh	C											1						1	1
Port Said	C	1			1	1													
France: Marseille	C		5	4	2	1		1											
Gambia	C	4																	
	D	4																	
Greece (see also table below): Pyrgos	C			2															
India	C	877	2,497	2,371	604	616	558	643	677										
	D	477	1,132	1,068	336	288	317	556	443										
Bassein	C		2			1										2	1		
	D		3													1			
Bombay	C		1	2	1													1	
	D		1	2		1												1	
Plague-infected rats		35	47	64	2	9	11	8	11	5	12	4	10	4	6	13	10		
Madras Presidency	C	81	127	196	69	31	45	40	33	62	28			4					
	D	34	57	110	43	22	37	22	24	26	15								
Rangoon	C	3	10	2		1		1						1	1				
	D	2	9	2		1								1					
Plague-infected rats		7	8	1	1				1	1			1				2		
India (Portuguese)	D	P				3													

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct 18, 1930	Week ended— Oct 25, 1930	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27	January, 1931: 3	10	17	24	31
Indo-China (see also table below):																			
Pnompenh	C	4	3	2					1	3	1	1	1				1		
	D			3	1				1	3	1	1	1				1		
Saigon and Cholon	C	1	1	1															
Iraq: Baghdad	C	9		1				P	2	2									3
	D	3		1					1	1									2
Kwang-Chow-Wan	C	1																	
Madagascar (see also table below): Tamatave	C	2	1	1	3		2			2	1	1		2					
	D			1	3					2		1							
Morocco	C	15			4		1						9		10				
	D	2											4		4				
Nigeria: Lagos	C	7	6	5	33	1	2	2	4	3	2		2		1				
	D	7	6	5		1	2	2	4	3	2		2		1				
Plague-infected rats		8	10	11	3	1	2	7	1	1	1	2	4						
Peru: Lima.[1]																			
Siam	C	7	3	1	3	1	1	1											
	D	6	2		3	1		1											
Bangkok	C	3						1				1		1	2				
	D	2						1				1		1	2				
Nagara Rajsima	C	2	1	1				1		3		8	4	3	4	6	3		
	D	2	1	1				1		3		6	3	3	1	3	2		
Syria: Beirut	C	2	5		1	1	3	1								1			
Tripolitania	C	2							4	6	2	1					2	2	
Tunisia:																			
Sfax district	C	1																	
Tunis	C					1		1				P	12			1	1		
Union of Socialist Soviet Republics:																			
Salsk region	C	7																	
	D	5																	
Transcaucasia-Karabakh	C																	6	

Union of South Africa:																			
Cape Province	C	1	1	------	1	------	------	------	------	P	P	------	------	------	------	------	------	------	------
	D	1	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Orange Free State	C	------	2	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
	D	------	2	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
On vessel: S. S. Marionga de Thermiotis at Avonmouth	C	------	------	------	------	------	------	------	------	------	------	------	------	1	------	------	------	------	------

Place		June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930
British East Africa (see also table above):							
Kenya	C	107	97	87	53	58	62
Greece (see also table above)	C	1	------	------	------	2	------
Indo-China (see also table above)	C	11	1	2	4	------	------
Madagascar (see also table above):							
Antisirabe Province	C	3	24	11	21	3	------
	D	3	24	11	21	3	------
Miarinarivo Province	C	1	1	2	7	18	------
	D	1	1	2	7	18	------
Moramanga Province	C	3	------	27	18	20	------
	D	3	------	27	17	20	------
Tananarive Province	C	16	28	39	79	125	------
	D	16	28	38	79	116	------

Place		June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930
Senegal:							
Baol [2]	C	2	62	79	48	53	------
	D	2	48	20	23	35	4
Dakar [2]	C	53	140	108	3	------	------
	D	117	122	90	8	------	------
Louga [2]	C	60	138	75	61	37	10
	D	21	103	33	30	25	3
Thies [2]	C	52	54	34	12	24	27
	D	35	30	20	4	15	23
Tivaouane [2]	C	43	119	110	20	53	31
	D	28	70	54	14	31	25

[1] Eight cases of plague were reported at Lima, Peru, during December, 1930. Plague infection is said to exist in interior towns north of Lima.
Senegal (see table below).
[2] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases: D, deaths: P, present]

Place		July 27–Aug. 23, 1930	Aug 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Week ended Oct 25, 1930	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27	January, 1931: 3	10	17	24	31
Algeria:																			
Algiers	C	3											1						
Constantine	C						1												
Oran	C											3							
Brazil:																			
Porto Alegre (alastrim)	C	1	1	26		14	14	8	20	8									
Rio de Janeiro	C						2												
British East Africa (see also table below): Tanganyika	C	242	522	95	3	1		13	7	26	18	334	23	1					
	D	37	60	6	1					1		35	1						
British South Africa: Southern Rhodesia	C	1	1	153	2	54	1	38	12		4								
	D								2		1								
Canada:																			
Alberta	C	1	1	22					1						19			7	
British Columbia—Vancouver	C	6	2	2		3					1				1	2			
Manitoba	C		1																
Winnipeg	C															1			
Ontario	C	20	10	19	16	20	9	14	7	12	3	1	1		8	8	10	3	
Kingston	C													2	4		1		
North Bay	C													1		1			
Ottawa	C	7	5		14		9	14		8	1	1			2		1	1	1
Sault Ste. Marie	C															1	11	8	5
Toronto	C		1							2	2								
Quebec	C	5							1			1						2	
Montreal	C	7																	
Saskatchewan	C	8	1	3		2			2		16						7	6	
China:																			
Changking	C	P	P	P	P	P	P	P	P		P	P							
Foochow	C	P	P	P		P		P		P		P							
Hong Kong	C													1					
Manchuria—																			
Harbin	C	2				1													
Kwantung—Dairen	C								2		1	1	1						
	D											1							
Nanking	C	P	P	P	P	P	P				P	P	P		P				

Shanghai—																			
Foreigners only	C	3	18	1	1		1				3	5	4	2	6		1		
Including natives	D		2					1				4	5	1	1	4	2		
Swatow	D	4	2	4	1	1		1	1			2		2	1	2			
Tientsin	C			1			1		1	1									
Chosen (see table below).																			
Colombia:																			
Barranquilla	C	2																	
Buenaventura	C	2																	
Cali	D			2							1								
Curacao (alastrim)	C	1																	
Dutch East Indies:																			
Java—Batavia and West Java	C	12	11	14	2	13	11		2		2	2	2		2				
	D	5	4	4	2	1	1		1			1			1				
Sanggi Islands	C	36	14		29														
	D	2	3		3														
France (see table below).																			
Greece (see table below).																			
Great Britain:																			
England and Wales	C	344	341	325	86	87	92	107	116	160	95	137	138	135	164	228	187		
Bradford	C		3	1	1						1				1				
Cardiff	C			1															
Leeds	C			1			2								2				
London	C	164	120	29	32	41	47	52	67	27	48	42	27	38	48	48	45		
London and Great Towns	C	268	223	52	58	68	82	88	136	74	112	111	105	131	162	162	154		
	D		1		1					1									
Stroke-on-Trent	C	2	1		1														
Scotland	C	5																	
Honduras:																			
Naco	C		5																
Puerto Castilla	C															4	7	1	
India	C	4,877	3,131	2,322	570	499	644	699	787	865	1,037								
	D	1,246	680	572	242	104	108	152	221	174	274								
Bombay	C	12	6	1							1				1	1	2		
	D	10	5								1				1	1			
Calcutta	C	25	14	12	2	4	3		3	5	6	4	10	19	15	15	28		
	D	21	9	11	2	2	3		3	2	4	2	7	13	10	10	16		
Cochin	C	14	3	12	3	5	10	7	4	5	6	7	6	7	2	5			
	D		1	1	1			2	2		2					1			
Karachi	C	4	4						2	1									
	D	3	2							1									
Madras	C	38	34	19	2	1	2	4	3	5	6	6		1	3	4			
	D	11	6	8			2				2	1			1				
Moulmein	C	2	1																
	D	1	1																
Negapatam	C	4	9	14	2	2	2	3	3		1	2							
Rangoon	C	3		2			1			1									
	D						1												
Tuticorin	C			1															
Vizagapatam	C			1															

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases. D, deaths; P, present]

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Week ended Oct. 25, 1930	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27	January, 1931: 3	10	17	24	31
India (French):																			
Chandernagor	C		3	3		3								5					
	D		2	1		1								2	1				
Karikal	C	9	5	1											1	2			
	D	9	2	1												2			
Pondicherry Province	C	22	35	38	2	2		7	7	7		5	8	8	7				
	D	22	33	36	2	2		7	7	5		5	7	8	7				
India (Portuguese)	C	9	4																
	D	2																	
Indo-China (see also table below):																			
Pnompenh	C			2						1				2					
	D	1								1									
Saigon and Cholon	C	1	1			2			2	1		1					3		
	D	3	1			2			1			1					2		
Iraq:																			
Baghdad	C	1	1	2															
	D	1																	
Mosul Liwa	C			69			6		7	9						1		2	
	D			27					1	1									
Ivory Coast (see table below).																			
Mexico (see also table below):																			
Jalisco (State) Guadalajara	D	1		3	1		1	1	1		2							1	
Juarez	C	2																	
	D	1		1	1														
Mexico City and surrounding territory	C	10	12	13	1	3	3	2	1	2		3							
	D	6	5	3	1		1					6							
Vera Cruz	C					1													
Morocco (see table below).																			
Nicaragua: Porto Cabezas	C												2						
Poland	C				2	3		3	1	2						2			
Portugal:																			
Lisbon	C	50	27	16	12			8	11		15	11	21	17		34			
Oporto	C	1																	
Siam	C			1															

Somaliland, British: Boales	C			1			1				1					1			
	D			1															
Spain	C	2	5		14	5	11	21	23	21	23		19	31	18				
Straits Settlements	C	8	6	5	3	3	4		3	9	1	3	3		1	3			
	D	3	1	1		1	1		1	2		2	2						
Sudan (Anglo-Egyptian)	C	42	128	82	3			2		3		47		47		17	1	7	
	D	3	52	7				1				5		5		1		7	
Sudan (French) (see table below).																			
Switzerland: Berne Canton	C	2		1															
Syria (see table below).																			
Tunisia: Tunis	C			2											13	4			
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C		P	P	P	P	P	P	P		P	P	P						
Orange Free State	C	P				1	1	P	P	P	P								
Transvaal	C	P	P	P	P	P	P	P	P	P	P	P	P						
Upper Volta	C									6						4			
On vessel:																			
S. S. Muncaster Castle at Manila from Hong Kong	C													1					
S. S. Matheran at Suez from Calcutta	C																	1	

Place		June, 1930	July, 1930	August, 1930	September, 1930	October, 1930 1-10	October, 1930 11-20	October, 1930 21-31	November, 1930 1-10	November, 1930 11-20	November, 1930 21-30	December, 1930 1-10	December, 1930 11-20	December, 1930 21-31
Indo-China (see also table above)	C	213	238	93	192	32	62	164		86		38	9	14
Ivory Coast	C							4		2		9		
Sudan (French)	C	76	34	39	P		17					43		
	D	18		3			2					16		4
Syria: Beirut	C	7	2	1										

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
British East Africa (see also table above)							
Kenya	C	186		424			
Chosen	C	3	2				
Seishin	C	2					
France	C	1					
Greece	C	1	6				
Mexico: Durango (see also table above)	D	3	3	2			1
Morocco	C	3	8	4	4	20	
Turkey	C	51	21	19	74		
	D	13	4	2	1		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases, D, deaths; P, present]

Place		July 27–Aug. 23, 1930	Aug 24–Sept. 20, 1930	Sept 21–Oct 18, 1930	Week ended— Oct. 25, 1930	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27	January, 1931: 3	10	17	24
Algeria:																		
Algiers	C	2	3				1			2								
Constantine Department	C	3		2	1					1		1			3	3		
Oran	C	1	1	3						3		2						
Bulgaria	C	1	4	6			1	2	1	1	3	6	3					
	D												1					
China:																		
Manchuria—Harbin (see also table below)	C	2	2	1							1							
Shanghai	C	1																
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C	1	3	1				2	1	1								
	D		1					2										
Beheira Province	C		1										1					
	D												1					
Cairo	C	7	2									1	1					
Port Said	C	4	1	1		1	1											1
Great Britain. Scotland—																		
Clydebank	C														3			
Ireland:																		
Irish Free State—																		
Mayo County—																		
Castlebar	C	1																
Westport	C	1																
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico:																		
Durango	D		1	2														
Mexico City, including municipalities in Federal District	C	9	7	8	1	1	5	4	1	1		12						
	D	2	2	2	1		3		2	3		2						
San Luis Potosi	D										1	1						
Morocco	C	8	2		1		1	1	1				8					
	D			1														

Palestine	C	3	3	3			2	1	1	6			1	1		2		1
Poland	C	34	23	22	7	8	15	7	12		21	9		5	28	11		
	D	3	1	2					1		3	3						
Portugal: Oporto	C	1		2		2	1	1	2	2	15							
Rumania	C	9	4	14	4	13	10	14	19		2							
	D	2					1	1	1									
Spain	C		1	2			4				1							
	D		1	2							1							
Tunisia	C	10	6	12					5		23							
Turkey (see table below).																		
Union of South Africa																		
Cape Province	C	P	P	P	P	P	P	P	P	P	P		P					
Municipality of East London	C		2	1				1	1									
Natal	C	P	P	2	P	P	P											
Orange Free State	C	P	P										P					
Transvaal	C	P	P	P	P	P	P	P	P	P			P					
Yugoslavia (see table below).																		

Place		June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930
China: Harbin (see also table above)	C		14	5		3	
Chosen: Seoul	C	2	3	2	1	7	1
Czechoslovakia	C	1		1			16
Greece: Athens	C	3	6	6	4	4	4
Latvia	C	3	3	1	2		

Place		June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930
Lithuania	C	16	18	7	24	1	5
	D			1	2		1
Turkey	C	2	7	11		28	3
Yugoslavia	C	6		2		2	2
	D			1		1	

YELLOW FEVER

	Cases
Brazil:	
Campos, Rio de Janeiro Province, May 23, 1930	1
Para—	
June 23, 1930	2
July 29, 1930 (death)	1
Gold Coast:	
July 10, 1930	1
Albosso, Aug. 4, 1930 (death)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

X

UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

ISSUED WEEKLY

BY THE UNITED STATES PUBLIC HEALTH SERVICE

VOLUME 46 :: :: NUMBER 8

FEBRUARY 20 - - 1931

SPECIAL ARTICLES

Prevalence of Influenza in the United States and Europe

Summary of Current Prevalence of Communicable Diseases

The Estimation of Cysteine in the Presence of Glutathione

Plankton and the Biochemical Oxidation of Organic Matter

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of public health.

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PUBLIC HEALTH REPORTS

VOL. 46 FEBRUARY 20, 1931 NO. 8

THE PREVALENCE OF INFLUENZA

United States.—The reports to the Public Health Service of cases of influenza for the week ended February 7, 1931, totaled 10,068, as compared with 12,828 cases for the preceding week. The figures, presented by geographical sections and States, appear on pages 433 and 434.

New York City, Maryland, and North Carolina, where the disease has been prevalent, reported fewer cases for the week ended February 7 than were reported for the preceding week. South Carolina showed a slight increase in prevalence. Massachusetts and Illinois reported decreased prevalence of influenza for the week ended February 7 as compared with the preceding week.

Maine and New Hampshire in the northeast and Georgia and Florida in the southeast reported increased prevalence, and there is some increase in California.

The disease is of mild type.

Europe.—Influenza is reported from a number of countries in Europe, but it is mild and there has not been any extensive epidemic. A report dated January 31, 1931, stated that in England and Wales influenza was reported in a number of cities, particularly in Liverpool. The mildness of the disease is indicated by the fact that most of the deaths attributed to influenza were of persons over 60 years of age.

In Switzerland outbreaks occurred in 17 districts. Basel and Zurich were chiefly affected. The general mortality in towns of more than 10,000 population for the weeks ended January 10 and January 17, 1931, was 14.5 and 15 per thousand, respectively. These rates are said to be low for this season of the year. In December the general mortality in these towns averaged only 12.6 per thousand.

In Spain influenza of a mild type prevailed, particularly in the cities of Madrid and Barcelona. The general mortality in these cities was somewhat higher than it had been during the corresponding period of recent years without epidemics, but it was lower than in January, 1927 or 1929.

In Czechoslovakia influenza has been reported in Bratislava and in some districts of Slovakia. The disease has appeared in Austria and in Greece, especially in Athens.

In Germany returns from sickness insurance organizations indicated that the epidemic reached its climax in the cities affected without causing any noticeable increase in mortality. In Poland the epidemic was said to be abating the latter part of January.

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES[1]

DECEMBER 28, 1930–JANUARY 31, 1931

The prevalence of certain important communicable diseases, as indicated by weekly telegraphic reports from State health departments to the Public Health Service is summarized below. The underlying statistical data are published weekly in the Public Health Reports under the section entitled "Prevalence of Disease."

Influenza.—There was a sharp increase in influenza cases from 4,660 cases during the 4-week period ended December 27, 1930, to 26,924 [2] cases during the 4-week period ended January 31, 1931. Stated otherwise, during the December period the number of cases amounted to about 65 per cent of the number for the corresponding period of the preceding year; for the January period this percentage had risen to 263.

The tendencies in the different regions of the United States, as shown by reports to the Public Health Service, are presented in the accompanying table.

TABLE 1.—*Number of influenza cases reported in different geographic sections during recent weeks of the winter of 1930–31 and during the corresponding weeks of the winter of 1929–30*

Region	Week ended—									
	Dec. 6, 1930	Dec. 13, 1930	Dec. 20, 1930	Dec. 27, 1930	Jan. 3, 1931	Jan. 10, 1931	Jan. 17, 1931	Jan. 24, 1931	Jan. 31, 1931	Feb. 7, 1931
New England and Middle Atlantic:										
1930–31	27	40	51	62	102	540	1, 390	2, 156	2, 153	1, 205
1929–30	59	68	120	54	87	104	71	87	93	86
East North Central:										
1930–31	52	76	49	62	59	89	118	354	679	558
1929–30	60	91	78	104	90	163	190	151	111	91
West North Central:										
1930–31	8	9	13	9	31	27	24	122	119	101
1929–30	16	20	16	20	26	61	80	61	83	41
South Atlantic:										
1930–31	760	769	633	661	868	1, 184	1, 408	3, 682	6, 697	6, 071
1929–30	1, 127	1, 144	786	1, 093	1, 466	1, 366	1, 239	1, 269	1, 232	1, 466
East and West South Central:										
1930–31	214	239	322	180	365	626	679	831	1, 087	1, 184
1929–30	429	541	470	415	724	757	561	886	977	1, 127
Mountain and Pacific:										
1930–31	111	86	121	106	85	157	129	173	261	294
1929–30	109	125	96	78	139	162	199	185	189	169
Total (all regions):[a]										
1930–31	1, 172	1, 219	1, 189	1, 080	1, 520	2, 623	3, 748	7, 318	10, 996	9, 418
1929–30	1, 800	1, 989	1, 566	1, 764	2, 532	2, 613	2, 340	2, 639	2, 685	2, 960

[a] 38 States and the District of Columbia included.

[1] From the Office of Statistical Investigations, U. S. Public Health Service. The numbers of States included for various diseases are as follows: Typhoid fever, 46; poliomyelitis, 47; meningococcus meningitis, 47; smallpox, 47; measles, 44; diphtheria, 46; scarlet fever, 46; influenza, 38.

[2] It should be recognized that these reports are incomplete and that the completeness of reporting varies greatly in the different regions.

The increase has clearly been sharpest in the North and South Atlantic sections, although there have been minor increases in the Great Lakes region also.

Some increase in mortality has taken place, but in general the cases seem to be of a very mild type.

Poliomyelitis.—The poliomyelitis incidence again declines, from 332 cases during the preceding 4-week period ended December 27 to 194 cases during the four weeks ended January 31. In October, 1929, the number of cases reported was more than four times as high as the number reported for the corresponding period of the preceding year. During the period ended December 27 this ratio stood at 2.9, and for the period ended January 31 it was 2.5.

The recent changes in the incidence of this disease have varied from section to section. The far west and the States west of the Great Lakes region have shown marked improvement, while in the remaining regions the ratio to last year has risen slightly since December.

Smallpox.—The number of reported cases of smallpox during the four weeks ended January 31 (4,276) was lower than for the corresponding period of last year (6,552) but higher than for 1929, when 2,960 cases were reported.

In some of the West North Central and South Central States, the recent incidence has risen somewhat more rapidly than the seasonal expectancy.

Scarlet fever.—The incidence of scarlet fever was somewhat higher than has been the experience of recent years. The number of cases reported during the 4-week period ended January 31 was 21,452, as compared with 19,030 last year and with 16,044 for the corresponding period of 1929. The incidence in relation to that of the same period of last year is higher especially in the following groups of States: New England (17 per cent), the Great Lakes (26 per cent), South Atlantic (20 per cent), and South Central (36 per cent). For the aggregated States the excess over last year is 13 per cent. In practically all these regions these excesses developed during the month of January.

Measles.—The number of cases of measles (29,666) reported during the 4-week period ended January 31 for the aggregated States is approximately one-third in excess of the cases reported in the corresponding period of each of the two preceding years. The excesses occur mainly in the South Atlantic, South Central, and West North Central regions.

Diphtheria.—For the States combined, diphtheria continues its gratifying low record. For the 4-week period ended January 31, 5,429 cases were reported, as against 6,706 last year—a decline of about 19 per cent. The decline obtained in all regions.

Meningococcus meningitis.—Improvement continues in meningococcus meningitis incidence. For the 4-week period ended January 31, 595 cases were reported, as compared with 942 last year—a decline of 37 per cent. The situation was slightly less favorable in the North Atlantic and South Central groups than in the remainder of the country, although in both areas the number of cases reported still fell below the number for last year.

Typhoid fever.—The incidence of typhoid fever dropped about 40 per cent during the month of January. The number of cases during the 4-week period ended January 31 (633) compared very favorably with the number reported for the same period in 1930. In both years, however, the disease was considerably more prevalent during the month than in January of 1929.

Mortality, all causes.—The mortality from all causes in a group of cities, as summarized in the Weekly Health Index of the Census Bureau, averaged 14.5 per thousand population, annual basis, as compared with 13.5 for the same period last year. In 1929, the rate for the corresponding period averaged 19.2, due to the influenza epidemic prevailing at that time.

STUDIES ON THE BIOCHEMISTRY OF SULPHUR

IX. THE ESTIMATION OF CYSTEINE IN THE PRESENCE OF GLUTATHIONE

By M. X. Sullivan, *Senior Biochemist*, and Walter C. Hess, *Assistant Chemist, National Institute of Health, United States Public Health Service*

Meldrum and Dixon, in their recent paper on "The properties of pure glutathione" (Biochemical Journal, **24**, 472, 1930), found that the Sullivan (1926) reaction for cysteine was markedly inhibited by the presence of glutathione in the proportion of 9.0 mg. of glutathione to 1.0 mg. of cysteine. If Meldrum and Dixon's results can not be explained and set aright, the findings of these investigators would detract more or less from the quantitative and perhaps qualitative value of the Sullivan reaction for cysteine in extracts of tissue or in the evaluation of the purity of glutathione. The fact, however, is that, by slight modifications of the Sullivan reaction as originally published, cysteine can be estimated quantitatively in any proportion of glutathione, at least up to 100 glutathione to 1 of cysteine.

Indeed, if Meldrum and Dixon had followed the cysteine procedure detailed by Sullivan (1929) in the second paper of the series on "Studies in sulphur metabolism" they would have found that reduced glutathione in the proportion of 9.0 mg. to 1.0 mg. of cysteine has no inhibiting effect on the estimation of cysteine.

The proof of this statement is shown by the following experimental results recently obtained with a sample of glutathione prepared by Pirie's (1930) modification of the Hopkins' (1929) procedure and with a sample of cysteine hydrochloride made from cystine and freed from iron by Warburg's (1927) acetone treatment.

Tested by the Okuda (1925) iodine method with reduction by heating with zinc and hydrochloric acid (Okuda, 1929), both the glutathione and the cysteine hydrochloride were found to be at least 99 per cent in the reduced form.

EXPERIMENTAL

Glutathione and cysteine hydrochloride were dissolved separately in 0.1 N hydrochloric acid. Aliquots were then taken and mixtures made so that each 5 c. c. of the mixture contained 1.0 mg. of cysteine and glutathione in descending amounts 9.0, 8.0, 6.0, 4.0, 2.0, 1.0 mg., etc. The standard was 1.0 mg. of cysteine (1.3 mg. of cysteine hydrochloride) in 5 c. c.

The Sullivan reaction was then run on 5 c. c., in the manner that Meldrum and Dixon presumably ran it; that is, without the presence of cyanide. Thirty minutes were given to color development before adding the sodium hyposulphite ($Na_2S_2O_4$) and reading. The results given in Table 1 showed some inhibition of the cysteine reaction by glutathione.

TABLE 1.—*The estimation of cysteine in the presence of glutathione*

Glutathione-cysteine ratio	Per cent cysteine determined	Glutathione-cysteine ratio	Per cent cysteine determined
(A) Glutathione 9, cysteine 1	70	(F) Glutathione 1, cysteine 1	93
(B) Glutathione 8, cysteine 1	77	(G) Glutathione ½, cysteine 1	100
(C) Glutathione 6, cysteine 1	87	(H) Glutathione ¼, cysteine 1	100
(D) Glutathione 4, cysteine 1	91	(I) Glutathione ⅛, cysteine 1	100
(E) Glutathione 2, cysteine 1	93	Cysteine control 1.0 mg.	

For reasons that need not be detailed here, the inhibition shown in Table 1 suggested primary or secondary oxidation of cysteine, so the experiment was repeated in the presence of sodium cyanide to act as an antioxidant. Two series were run: (A) with 0.5 c. c. of 5 per cent aqueous sodium cyanide; (B) with 1 c. c. of 1 per cent sodium cyanide, before adding the naphthoquinone, etc. The procedure employed was as follows: To 5 c. c. of each solution and standard add the sodium cyanide, shake, and add 1 c. c. of a freshly prepared 0.5 per cent aqueous solution of 1.2 naphthoquinone-4-sodium sulphonate, shake (5 to 10 seconds), add 5 c. c. 10-20 per cent solution of anhydrous sodium sulphite in 0.5 N sodium hydroxide, mix, and wait

30 minutes at a temperature about 20° C. A reddish brown color appears. Then add 1 c. c. of a 2 per cent solution of sodium hyposulphite ($Na_2S_2O_4$) in 0.5 N sodium hydroxide. The brown red color in the presence of cysteine is converted to a purer red. The reaction is given by no other compound tested, not even by glutathione or cysteine amine. As shown by Sullivan and Hess (1930), even isocysteine is negative.

As shown in Table 2 no inhibition of the Sullivan cysteine reaction occurs when cyanide is present to prevent oxidation of the cysteine.

TABLE 2.—*The determination of cysteine in the presence of glutathione—in the presence of sodium cyanide*

Glutathione-cysteine ratio	Per cent cysteine determined	
	Series A	Series B
(1) Glutathione 9, cysteine 1	97	100
(2) Glutathione 8, cysteine 1	101	99
(3) Glutathione 6, cysteine 1	100	100
(4) Glutathione 4, cysteine 1	100	99.5
(5) Glutathione 2, cysteine 1	101	101
(6) Glutathione 1, cysteine 1	100	100

The experiment shows clearly that in the presence of cyanide (1 c. c. of a 1 per cent freshly prepared aqueous solution of sodium cyanide is satisfactory) glutathione has no inhibiting action on the Sullivan reaction at the ratio 9 glutathione to 1 cysteine employed by Meldrum and Dixon.

Even at the level, 18 mg. of glutathione to 1.0 mg. of cysteine, the colorimetric reading of the 1.0 mg. in the mixture was 19.8 when matched against 1.0 mg. of cysteine similarly treated and set at 20.

Higher proportions of glutathione to cysteine call for modification in the procedure. With modifications later detailed there is no inhibition of the cysteine reaction when the proportions are 36 to 1 or even 100 to 1.

The higher glutathione content calls for more naphthoquinone. When to the glutathione-cysteine mixture 36 mg. to 1 and to the standard cysteine solution 1.0 mg. in 5 c. c. 0.1 N hydrochloric acid there were added 1 c. c. of 1 per cent aqueous sodium cyanide and 1 c. c. of a 1 per cent solution of the naphthoquinone followed by the regular sodium sulphite in 0.5 N sodium hydroxide and then after 30 minutes color development by 1 c. c. of the $Na_2S_2O_4$ in 0.5 N sodium hydroxide, no inhibition occurred.

Under the same condition the mixture containing glutathione 100 mg., cysteine 1.0 mg., only 75 per cent of the cysteine was estimated. On increasing the naphthoquinone to 2 c. c. for the 100 to 1 mixture and for the standard, 89 per cent of the cysteine was estimated.

Since on theoretical grounds the apparent retardation of the Sullivan cysteine reaction in the 100 to 1 mixture seemed to be connected with the possible buffering action of the glutathione, the experiment with the glutathione-cysteine mixtures 100 to 1 was repeated with stronger alkali, as follows: To 5 c. c. of mixture and standard were added 1 c. c. of 1 per cent aqueous sodium cyanide, 2 c. c. of 1 per cent aqueous 1.2 naphthoquinone-4-sodium sulphonate, followed by 5 c. c. of 10 per cent sodium sulphite in N sodium hydroxide, and after 30 minutes standing by 1 c. c. of a 2 per cent solution of sodium hyposulphite in N sodium hydroxide. The average of four separate runs gave returns varying from 96.1 per cent to 100.8 per cent of the theoretical cysteine, with an average of 98.3 per cent.

Using the procedures detailed in this paper, cysteine can be estimated quantitatively by the Sullivan method in any proportion up to 100 glutathione to 1 cysteine.

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EXPERIMENTAL STUDIES OF NATURAL PURIFICATION IN POLLUTED WATERS

IV. THE INFLUENCE OF THE PLANKTON ON THE BIOCHEMICAL OXIDATION OF ORGANIC MATTER

By C. T. Butterfield, *Bacteriologist*, W. C. Purdy, *Plankton Expert*, and E. J. Theriault, *Chemist, United States Public Health Service*

The abstraction of dissolved oxygen from polluted water during the natural purification process is a well-known phenomenon. It is also well known that the amount of dissolved oxygen used up is defi-

nitely related to the amount of pollution present. While these facts in regard to the natural purification of polluted water are well established, the mechanism by which the oxidation is accomplished can only be surmised. For instance, if a portion of polluted water is examined, many bacteria and plankton are found. If all of these organisms are killed or removed from the water, oxidation ceases. The interreactions of these biological factors and the part that each plays in the process of natural purification constitute the subject of this study.

Extensive studies are described in the literature on the rate and extent of biochemical oxidation of polluted water. In general, these studies have been confined to a determination of the amounts of dissolved oxygen absorbed after various periods of incubation at different temperatures without reference to the biological factors concerned. Theriault (1927) presents a review of these studies. Among them, Dupré (1884) and Müller (1911) recognized that the oxidation phenomenon was dependent upon bacterial activity. Novy, Roehm, and Soule (1925), Novy and Soule (1925), and Soule (1925), studied the respiratory quotients (O_2 to CO_2 ratios) of certain bacteria and protozoa. Unfortunately for our purposes it was not necessary for these workers, in determining respiratory quotients, to obtain any information regarding the number of organisms at work or the amount of nutrient material consumed.

In his text "The Principles of Soil Microbiology," Waksman (1927, p. 339) discusses the interrelationships of protozoa and bacteria in the soil. "Decomposition of organic matter as well as other biological activities are resultants of the multiplication and growth of bacterial cells. By destroying the excess of bacteria, the protozoa may stimulate further bacterial development and, therefore, further biological transformations in the soil." A divergent view is held by Russell and Hutchinson, who attempt (Waksman, p. 755) "to correlate the destruction of protozoa following partial sterilization with the increase in the numbers of bacteria and their activities and subsequently soil fertility." Briefly stated, the opinion just quoted regards protozoa as probably inimical to soil fertility, whereas the opinion first quoted credits protozoa with probable usefulness to this same end.

Purdy and Butterfield (1918), in their study on the effect of plankton animals on bacterial death rates, showed quite clearly that certain of the protozoa are responsible for the destruction of large numbers of bacteria in the natural purification process. They also observed that when bacteria only were present, the bacteria soon reached a limiting number, which was maintained for several weeks, and that under such conditions, as judged by physical appearances, very little purification of the samples occurred. When plankton also

were present, the limiting bacterial population was not maintained and the process of natural purification apparently proceeded to completion. Chemical examinations of the samples were not made.

PRELIMINARY EXPERIMENTS

At the start of the present study a number of preliminary experiments were made with samples containing such heterogeneous combinations of bacteria and plankton as are normally found in polluted river water. One of these experiments was performed on the Berkefeld filtrate of a raw sewage. One portion of this filtrate was inoculated with a heterogeneous mixture of bacteria, plankton-free, which had been isolated from the sewage. This portion, suitably diluted with plankton-free dilution water, was transferred to sterile dissolved oxygen bottles and incubated at 20° C. Daily determinations were made of the total bacterial count and of the dissolved oxygen content of the incubated samples, with occasional observations to verify the absence of plankton.

As a part of the same experiment, the remainder of the Berkefeld filtrate was inoculated with a small portion of raw sewage to restore the plankton as well as the bacteria which the unfiltered sewage originally contained. This second portion was then treated and examined as was the first portion, except that daily examinations for plankton were also made.

Whatever the expectancy may have been, it was found that oxidation was far more rapid in the samples which contained plankton than in those samples from which the plankton had been excluded, although the observed numbers of bacteria were greater in the absence of plankton. The more extensive oxidation observed in the plankton-bearing portion might be ascribed to the consumption of dissolved oxygen by the plankton. The greater variety of bacteria introduced with the sewage may also have been beneficial in promoting a more vigorous oxidation. Other factors are to be considered, including possible relationships between the bacteria and the plankton.

Because of the number of the variables involved these preliminary studies on samples of sewage containing heterogeneous inoculations, while instructive, did not offer any opportunity for determining the separate influence of the various biological factors concerned. Accordingly, it was decided to determine in a simple reproducible medium:

1. The oxidation, if any, which occurs in the absence of all living organisms.
2. The oxidation which takes place in the presence of pure or mixed cultures of bacteria in the absence of plankton.
3. The oxidation which is effected by pure cultures of plankton in the absence of bacteria.

4. The oxidation which occurs in the presence of both bacteria and plankton in pure and in mixed cultures.

Unless specific mention to the contrary is made, the medium selected for these experiments contained 0.005 gram each of dextrose and peptone per liter in phosphate—buffered solution. The growth characteristics of bacteria in this medium have already been described by one of us (Butterfield, 1929 *a*).

OXIDATION IN THE ABSENCE OF ALL LIVING ORGANISMS

Tests were made with the dilute dextrose-peptone solution to determine whether it would use up dissolved oxygen in the absence of living organisms. In making these tests the dilute medium, suitably sterilized, was thoroughly aerated and tested under various conditions. A second portion was inoculated with enough of a suspension of *Bact. aerogenes* to provide a count of 23,500 organisms per c. c. A third portion was inoculated with the same amount of the *Bact. aerogenes* suspension heated sufficiently to kill all living bacteria in it. For the tests the samples were transferred to sterile dissolved oxygen bottles, with precautions against the introduction of any contamination. All bottles were incubated at 20° C. At the start and at appropriate times thereafter two bottles from each series were removed from the incubator and examined to determine the bacterial content and the amount of dissolved oxygen left in solution. The bacteriological examinations were made by ordinary plating methods and also by direct microscopic count. The results obtained are presented in Table 1.

TABLE 1.—*Bacterial counts and oxygen depletions observed in dilute dextrose-peptone solution when (1) no biological inoculation is added, (2) Bact. aerogenes are added, and (3) dead Bact. aerogenes are added*

Time, in days	(1) No biological inoculation added		(2) Bact. aerogenes added		(3) Dead Bact. aerogenes added	
	Bacteria per c. c.	Oxygen loss in p. p. m.	Bacteria per c. c. (living)	Oxygen loss in p. p. m.	Bacteria per c. c. (living)	Oxygen loss in p. p. m.
0	0	----------	23,500	----------	0	----------
	0	----------	23,500	----------	0	----------
1	0	−0.11	4,700,000	1.78	0	−0.02
	0	−.11	3,950,000	1.58	0	0.00
2	0	.19	4,500,000	2.55	0	.07
	0	.05	5,200,000	2.45	0	.08
3	----------	----------	4,550,000	2.85	0	.08
	----------	----------	4,500,000	2.77	0	.06
4	0	.18	4,950,000	2.75	0	.08
	0	.15	6,250,000	2.56	0	−.01
7	0	−.02	4,700,000	2.77	0	.08
	0	−.02	5,350,000	2.87	0	.04
10	(1)	----------	4,800,000	3.22	20	−.02
	----------	----------	4,700,000	2.81	3	−.09

[1] Bottles from this series were inoculated with bacteria at this time. These contaminated bottles produced results similar to those observed when living bacteria were added at the start.

It is noted that in the absence of bacteria no appreciable oxygen loss was observed in this medium during 10 days of storage at 20° C. Similarly, deoxygenation did not occur when dead cells of *Bact. aerogenes* were present. When the medium was inoculated with living cells of *Bact. aerogenes* at the start, they multiplied rapidly, and a corresponding loss in the dissolved oxygen content of the medium was observed. As a counter control some bottles of the sterile medium were removed from the incubator on the tenth day and inoculated with bacteria. The subsequent history of these bottles was the same as that of the bottles which received living bacteria at the start.

OXIDATION IN THE PRESENCE OF PURE CULTURES OF BACTERIA

The major portion of the work with pure cultures of bacteria was done with *Bact. aerogenes*. In these experiments an attempt was made to establish definite limits for the oxygen requirements of this organism under standard conditions in order that when grown in combination with plankton the symbiotic effect and the oxygen requirements of the plankton as such might more definitely be estimated. A few tests were made with pure and with mixed cultures of other bacteria, *proteus*, *coli*, and a small sewage coccus, to determine the extent to which the findings with *Bact. aerogenes* were representative of bacterial oxidation.

In the following tests to determine the oxygen requirements of *Bact. aerogenes* growing under standard conditions the dilute dextrose-peptone solution was prepared and sterilized, usually in 10-liter quantities. The inoculation with *Bact. aerogenes* was accomplished by taking the growth from a 24-hour 37° C. agar slant and suspending it in 100 c. c. of sterile water. Varying amounts of this suspension were added to the sterile medium, depending on the initial concentration of bacterial cells desired. One c. c. of this suspension per liter of medium yielded an initial bacterial content of approximately 60,000 per c. c. (A 24-hour, 37° C. agar slant of *Bact. aerogenes* with an inoculated surface ½ by 2½ inches in area usually contains 5 to 7 billion viable cells.) The temperature of the inoculated medium was then brought to 20° C., and it was vigorously agitated to insure thorough mixing and a proper dissolved oxygen content. The medium was then allowed to stand for a few minutes to permit the escape of any entrained air and was then siphoned to sterile dissolved-oxygen bottles, suitable precautions being taken to prevent the entrance of any contamination.

At the start of a test, determinations were made of the bacterial count and dissolved oxygen content of some of the first and of the last bottles filled. No appreciable differences were observed at any time between the first and the last portions withdrawn. All bottles

were stored in an incubator, held at a constant temperature of 20° C. Examinations were made at appropriate time intervals thereafter to determine the number of *Bact. aerogenes* per c. c. and the residual dissolved oxygen content. Tests were also made to determine whether any extraneous bacteria or plankton had gained entrance to the bottles. As a rule, two bottles were analyzed at each period, and the results secured from these duplicates were generally in good agreement. The results obtained from nine such experiments are presented in Table 2. The A and B sections of the table contain the bacteriological and chemical results, respectively.

TABLE 2.—*Bacterial counts and oxygen depletions observed in dilute dextrose-peptone solution, incubated at 20° C., when inoculated with a pure culture of bacteria*

Time, in days	Experiment No.									Average
	4	5	6	7	8	14	15	16	17	
	A. BACT. AEROGENES PER C. C.									
0	48,000	4,250,000	88,000	239,000	1,000,000	37,700	640,000	370,000 417,000	85,000 84,000	753,000
1	2,700,000	11,400,000	5,000,000	6,650,000	6,700,000	5,400,000 5,600,000	5,200,000 6,800,000	6,700,000 7,200,000	4,100,000 4,500,000	6,130,000
2	6,200,000	12,300,000	7,800,000	6,350,000	7,500,000	[1]5,900,000	6,800,000 6,550,000	8,250,000 9,050,000	7,400,000 7,200,000	7,630,000
3	6,800,000	13,400,000	6,200,000	7,000,000	6,900,000	6,400,000 6,200,000	[1]6,290,000	8,800,000 6,700,000	7,800,000 7,700,000	7,600,000
4	5,500,000	[1]12,900,000	7,000,000	6,100,000	6,750,000	6,300,000	5,800,000 6,000,000	9,100,000	[1]7,160,000	7,410,000
5	6,100,000	12,400,000	5,600,000	5,800,000	6,700,000	4,750,000	7,050,000 6,600,000	9,600,000	6,450,000 6,700,000	7,150,000
6	6,250,000	12,700,000	6,650,000	6,300,000	6,050,000	[1]4,480,000	6,500,000 5,900,000	[1]9,300,000	8,900,000	7,430,000
7	7,800,000	10,800,000	5,800,000	5,550,000	7,300,000	4,200,000	6,500,000	9,000,000	6,600,000	7,060,000
8	5,450,000	11,200,000	5,700,000	6,900,000	6,550,000	6,300,000	6,300,000	7,900,000	8,150,000	7,160,000
10	5,800,000	10,800,000	5,800,000	6,900,000	6,800,000	4,900,000	6,170,000	7,500,000	7,000,000	6,850,000
15[2]	---------	7,650,000	4,200,000	4,150,000	4,350,000	4,100,000	6,200,000	6,100,000	---------	[2]5,250,000
	B. OXYGEN LOSS IN P. P. M.									
1	1.96	---------	2.33	2.57	2.49	2.06 1.92	2.05 1.88	2.83 2.06	2.23 2.09	2.24
2	3.07	2.83	2.50	2.75	2.44	[1]2.48	3.12 2.28	3.17 2.63	3.30 3.30	2.77
3	2.63	2.94	2.58	2.61	2.54	3.01 2.94	[1]2.56	2.69 2.47	3.35 3.36	2.75
4	2.76	[1]3.08	2.50	2.91	2.74	2.95	2.44 2.37	2.64	[1]3.45	2.83
5	2.79	3.23	2.56	3.18	3.69	3.13	2.45 2.30	3.01	3.58 3.50	3.05
6	2.81	3.64	2.89	3.20	2.53	[1]3.17	2.47 2.37	[1]2.90	3.63	3.02
7	2.80	3.21	2.55	2.86	3.17	3.21	2.30	2.79	3.69	2.95
8	2.60	2.80	2.56	2.89	3.03	3.23	2.94	3.04	3.67	2.97
10	3.07	2.89	2.66	3.64	3.41	3.08	3.02	3.00	3.70	3.16
15[2]	---------	3.01	3.32	3.48	2.32	3.37	2.86	4.00	---------	[2]3.19

[1] Calculated figure; mean of preceding and following results.
[2] Includes results obtained at 13 to 16 days.

The results obtained in this series of experiments indicate that within 48 hours after inoculation into a sterile dextrose-peptone medium the total count of *Bact. aerogenes* increases to a limiting figure which is fairly uniform in the different experiments. Growth of

bacteria then appears to cease, but the maximum count is sustained for several days.

It is noteworthy that oxygen is absorbed at a rapid rate only while the bacteria are in a state of active multiplication. This absorption of oxygen practically ceases after the limiting number of bacteria has been reached, even though the viable bacterial population remains quite high, (10,000,000 cells per c. c. in some experiments). This observation has been supported in experiments where the examinations have been continued for 30 or 40 days. The indications are that under the given conditions, the oxygen requirement of resting bacterial cells is negligibly small (less than 0.01 part per million of oxygen daily per million bacteria). It also seems fair to conclude that biochemical oxidation is effected only by growing cells.

Using the same technique as in the experiments with *Bact. aerogenes*, tests were also made with *Bact. proteus*, *Bact. coli*, and a small coccus isolated from sewage. The first strain of *Bact. coli* tried failed to grow in the dilute medium at 20° C., though it grew well at 30° and 37° C. Another strain of *Bact. coli* was used which did grow well in the dilute medium at 20° C. This strain had the cultural characteristics of the so-called fecal type. The bacteriological and the oxygen results obtained in these experiments with cultures other than of *Bact. aerogenes* are presented in Table 3, sections A and B, respectively. The average results previously obtained with *Bact. aerogenes* in the same medium are also included for comparative purposes.

TABLE 3.—*Bacterial counts and oxygen depletions observed in dilute dextrose-peptone solution incubated at 20° C., when inoculated with bacteria in pure culture*

Time, in days	Bact. aerogenes average 9 experiments	Bact. coli		Bact. proteus		Small sewage coccus, experiment No. 34
		Experiment No. 37	Experiment No. 41	Experiment No. 31	Experiment No. 32	
A. BACTERIA PER C. C.						
0	753,000	61,900	31,000	7,900	200	1,190
1	6,130,000	2,960,000	6,400,000	3,460,000	42,000	70,500
2	7,630,000	5,380,000	9,700,000	5,280,000	5,650,000	16,400,000
3	7,600,000	5,020,000	8,800,000	6,220,000	6,100,000	18,200,000
4	7,410,000			5,100,000	5,500,000	
5	7,150,000		10,200,000	4,900,000	5,700,000	19,300,000
6	7,430,000	5,550,000	9,980,000			
7	7,060,000			4,320,000	5,900,000	18,800,000
10	6,550,000	4,300,000	10,100,000	3,220,000	4,680,000	18,000,000
15	5,250,000	5,080,000	8,920,000	3,290,000	3,850,000	20,200,000
B. OXYGEN LOSS IN P. P. M.						
1	2.24	1.52	2.42	1.84	0.02	0.23
2	2.77	2.04	3.06	3.67	2.46	2.43
3	2.75	2.29	3.40	4.10	3.94	3.17
4	2.83			4.26	4.22	
5	3.05		3.66	4.59	4.64	2.96
6	3.02	2.66	3.88			
7	2.95			4.72	4.75	3.18
10	3.16	2.78	4.47	4.56	4.67	3.68
15	3.19	2.90	3.95	4.02	4.79	3.98

As already noted in experiments with *Bact. aerogenes*, each pure culture increased rapidly until a limiting number was reached, and thereafter no marked change in the count was observed for several days. As before, active deoxygenation took place only during the growth period, and it practically ceased after the maximum count was reached. It is to be noted that the limiting number of bacteria developing is somewhat different for each species and that the extent of the oxygen loss also varies slightly with different bacteria. In fact, these differences are explainable on the basis of known relationships between the limiting number of bacteria, the size of the individual organisms, and the concentration of the food, as already discussed in an earlier paper (Butterfield, 1929 *b*). Variations in the extent of oxygen absorption are also to be expected as a result of differences in the availability of the food material to the various species of bacteria. Greater significance attaches to the observation that in all experiments bacterial multiplication ceased after a few days' incubation and that this cessation of activity was reflected in the oxygen results.

OXIDATION IN MIXED CULTURES OF BACTERIA WHEN PLANKTON ARE ABSENT

On the basis of preliminary work with sewage organisms it appeared desirable to use inoculations of graded complexity when work was undertaken with mixed cultures. In the first experiment only two species of bacteria were used, namely, *Bact. aerogenes* and an unidentified organism which produced a yellow pigment. This latter bacterium had been frequently found associated with the protozoon *Colpidium*. In the next experiment a mixture consisting of four stock cultures—*Bact. aerogenes*, *Bact. proteus*, *Bact. coli*, and *Bact. subtilis*—was used. In two other experiments the above stock cultures were used together with a number of unidentified cultures picked at random from plates made from river water and sewage. These mixtures contained, respectively, 15 and 18 different strains of bacteria. An attempt to obtain a more complex mixture by washing the growths from plates made from river water and sewage was unsuccessful, as several varieties of plankton, which had multiplied or perhaps only survived on the plates, were found in the inoculation. The results obtained in these experiments with mixed cultures of bacteria are given in Table 4, section A containing the bacteriological and section B the oxygen results.

Table 4.—*Bacterial counts and oxygen depletions observed in dilute dextrose-peptone solution incubated at 20° C., when inoculated with bacteria in mixed culture, but free from plankton*

Time, in days	2 bacterial species	4 bacterial species		15 bacterial species		18 bacterial species	
	Experiment No.						
	24	31	32	62	63	60	61
A. BACTERIA PER C C.							
0	470,000	6,250	141	4,820	5,090	6,550	9,650
1	4,900,000	2,360,000	27,500	7,920,000	8,080,000	5,050,000	5,400,000
2	5,600,000	6,220,000	6,520,000	7,480,000	9,880,000	7,020,000	6,420,000
3	15,100,000	7,120,000	6,680,000	9,420,000	10,500,000	6,100,000	5,200,000
4	13,600,000	5,050,000	7,180,000			6,220,000	8,120,000
5	15,200,000	7,750,000	5,050,000	6,120,000	8,920,000	6,500,000	7,380,000
7	5,600,000	4,450,000	5,480,000	7,580,000	10,000,000	5,550,000	5,680,000
9	12,200,000			4,780,000	8,900,000	5,000,000	6,100,000
10	13,000,000	4,250,000	5,380,000	6,950,000	8,000,000	2,300,000	1,880,000
15	7,800,000	4,350,000	4,680,000	5,500,000	7,500,000	2,280,000	3,810,000
B. OXYGEN LOSS IN P. P. M.							
1	2.02	0.96	−0.05	3.46	3.40	1.84	3.24
2	2.60	3.16	2.28	3.77	3.86	2.95	4.00
3	3.72	3.86	3.82	3.85	3.99	4.36	4.35
4	4.46	4.08	4.05	4.09	4.06	2.92	4.52
5	5.21	4.10	4.30	4.33	4.14	2.99	4.72
7	4.76	4.50	4.71	4.43	4.49	3.36	4.74
9	5.07	4.46	4.68	4.50	4.40	3.28	5.00
10	5.30	4.42	4.64	4.80	4.34	3.82	5.20
15	5.15	4.41	5.00	4.65	4.49	4.52	5.15

The data presented in Table 4 are in good general agreement with the results obtained with pure cultures. As before, (1) the bacteria increased in numbers until a limiting population was reached, which (2) was sustained for several days. (3) Oxygen was used up at a rapid rate, but (4) only while the bacteria were in a state of active multiplication. The circumstance that the total oxygen demand is somewhat greater with mixed than with pure cultures accords satisfactorily with our knowledge of the food idiosyncrasies of bacteria. With increasing complexity of inoculation it is to be expected that the proportion of unutilized food would diminish.

Thus these four significant facts regarding bacterial growth and oxygen depletion, in the absence of plankton, have been established for certain bacteria growing in pure culture and also in fairly heterogeneous mixtures. In this connection it should be noted that in a few experiments the bacterial counts and oxygen depletions have been followed for 30 to 40 days without observing any marked change.

It is to be noted that the experiments already presented were all conducted in a buffered medium containing 0.005 gram (5 mg.) each of dextrose and peptone per liter. While the results at this food concentration are reasonably consistent, it appeared desirable to repeat some of these experiments in media of different concentra-

tion. In the experiments presented in Table 5 the food concentration in terms of dextrose and peptone was accordingly varied from 1 to 12 mg. per liter. *Bact. aerogenes* was used for the inoculation, and the technique followed was the same as in previous experiments. The results for the first four days are the average values obtained from duplicate samples at each concentration. The figures for the fifth day are the average values obtained from four closely agreeing observations. In all cases the observed depletion of oxygen has been referred to the amount used up with 5 mg. each of dextrose and peptone per liter, that is, the observed loss with 1 mg. per liter was multiplied by five, etc. The bacterial figures, however, are unchanged.

TABLE 5.—*Bacterial counts and oxygen depletions observed in dilute media containing various amounts of dextrose and peptone, when inoculated with Bact. aerogenes in pure culture and incubated at 20° C.*

Time, in days	Milligrams each of dextrose and peptone per liter				
	1.0	2.5	5.0	8.0	12.0
A. BACT. AEROGENES PER C. C.					
0	7,600	20,300	34,100	47,000	111,000
5/24	7,900	26,600	58,800	102,000	232,000
1	41,500	702,000	6,050,000	10,400,000	16,100,000
2	52,500	1,280,000	6,780,000	11,700,000	16,700,000
3	59,200	1,160,000	5,950,000	10,700,000	19,600,000
4	45,500	1,060,000	7,350,000	11,000,000	20,200,000
5	44,000	1,080,000	7,320,000	12,400,000	18,800,000
B. OXYGEN LOSS [1] IN P. P. M.					
5/24	0.02	−0.02	0.04	0.02	0.04
1	0.15	1.55	2.10	2.06	2.14
2	2.85	2.57	2.66	2.49	2.58
3	2.92	2.75	2.68	2.54	2.68
4	2.55	2.72	2.70	2.62	2.64
5	2.98	2.94	2.80	2.69	2.62

[1] Results obtained by multiplying the observed depletion by the factor required to express each in terms of the 5.0 mg. per liter concentration.

Bacterial growth with 1 and 2 mg. each of dextrose and peptone per liter was slower and less regular than in media containing larger amounts of food. The oxygen demand results show a slight but systematic tendency to increase with decreasing concentrations. In part this trend is due to the omission of any correction for the oxygen demand of the dilution water. Irrespective of concentration, the absorption of dissolved oxygen practically ceased after a few days.

The conclusion drawn from these and similar experiments is that growth of bacteria, either in pure or in mixed culture, presents certain definite and readily reproducible characteristics which are not greatly altered by variations in food concentration within the usual pollutional loading of streams.

OXIDATION BY PURE CULTURES OF PLANKTON IN THE ABSENCE OF BACTERIA

The isolation of certain kinds of plankton in pure culture but not free from bacteria presents but few difficulties greater than those which are encountered in the similar isolation of bacteria. But the freeing of individual organisms of such a plankton culture from bacteria is a tedious and time-consuming operation. Even this, however, can be accomplished with patience and careful technique, but it is only a small part of the problem of maintaining plankton in pure, bacteria-free culture. A medium must be available in which the bacteria-free organism will multiply. Of necessity this medium must be selected by the trial and error method. The desired organism, freed from bacteria, is placed in the sterile medium under trial. If growth occurs and the medium remains bacteria-free, success is attained.

At the start of these investigations it was planned to study the activities of at least three plankton organisms in bacteria-free culture. With this in view, attempts were made to isolate (1) a very small plankton, (2) a plankton of medium proportions, such as *Colpidium*, and (3) one of the larger organisms, such as *Paramecium* or *Oxytricha*. Attempts to secure the small plankton in bacteria-free culture failed, although it was successfully grown in media containing a very limited number of bacteria species. *Colpidium* [1] was obtained and successfully perpetuated in bacteria-free culture. Thus far all efforts [2] to obtain either *Paramecium* or *Oxytricha* in bacteria-free culture have failed, although much time has been spent on *Paramecium*, a large number having been washed free from bacteria and inoculated into a variety of media.

Consideration is now given to the results obtained with *Colpidium*. In the experiments with bacteria only, described above, a synthetic medium, containing 5 mg. each of dextrose and peptone per liter of phosphate-buffered dilution water, was employed. *Colpidium* in a bacteria-free state has invariably failed to grow in this medium, although this ciliate grows luxuriantly in this same medium when a slight initial inoculation of living bacteria is added.

By increasing the concentrations of dextrose and peptone in this medium it was found that when 500 or more mg. of each were present per liter, *Colpidium* would multiply and reach very high numbers even in the absence of all bacterial life.

Preliminary experiments were made to determine the amount of dissolved oxygen consumed by *Colpidium* growth in this more concen-

[1] Isolated by Dr. M. A. Barber, U. S. Public Health Service.
[2] Recent work not within the scope of this paper seems to have been successful with *Paramecium*.

trated medium. The tests were made by the standard dissolved oxygen analytical procedures before the experimental difficulties with these procedures in the presence of such large amounts of organic materials were definitely known. These experiments are nevertheless of value, for the results obtained serve to fix roughly the upper limits of oxygen consumption, inasmuch as the experimental errors involved invariably tended apparently to increase the loss in dissolved oxygen in the medium. Four such preliminary experiments were made. The procedure given for the cultures of bacteria only was followed, with the exceptions that the concentrations of dextrose and peptone in the medium were much greater and that bacteria-free *Colpidium* was the only inoculation added. In every case the incubated sample in which the residual dissolved oxygen was determined was also examined to ascertain the number of *Colpidium* per c. c. and to establish the absence or presence of bacterial contamination. Occasional bottles were found on the fifth day of storage and thereafter which had become contaminated with bacteria. The results obtained from such bottles were of course eliminated from consideration.

Owing to the inherent, slower rate of multiplication of such plankton organisms as *Colpidium*, as compared with the rate of division of bacterial cells, observations made at shorter intervals of time than five days are not instructive. The results obtained in these preliminary experiments are presented in Table 6.

TABLE 6.—*Colpidium counts and oxygen depletions observed in dextrose-peptone solutions inoculated with Colpidium in pure, bacteria-free culture and incubated at 20° C.*

Time of incubation, in days	Concentration of dextrose and of peptone in mg. per liter	Colpidium per c. c. in cubic standard units	Oxygen depletion in p. p. m.
5	5,000	10,350	3.17
5	500	906	1.01
15	500	1,780	2.23
20	500	4,830	5.68

Repetitions of these experiments, using the improved technique and apparatus described by Theriault and Butterfield (1929) for the determination of oxygen demand in the presence of unusual amounts of organic material, provided data of greater quantitative significance. For these tests the concentration of dextrose and of peptone was increased to 5,000 mg. per liter. No difficulty was experienced in obtaining accurate oxygen demand results with this apparatus and procedure. Examinations were made at frequent intervals for 27 days to determine (1) the *Colpidium* content, (2) the oxygen depletion, and (3) the absence of any bacterial contamination. The results

obtained from one such test with a pure, bacteria-free culture of *Colpidium* are presented in Table 7.

TABLE 7.—*Colpidium counts and oxygen depletions observed in a solution containing 5,000 mg. each of dextrose and of peptone per liter when inoculated with a pure culture of Colpidium and incubated at 20° C.*

Time, in days	Oxygen depletion in p. p. m.	Colpidium per c. c.		Bacteria per c. c.
		Individuals	Cubic standard units	
0		3	6	None.
1	7.0	4	9	Do.
2	9.5	13	26	Do.
4	9.0	83	224	Do.
5	9.2	160	570	Do.
7	11.8	755	2,643	Do.
8	11.5	1,410	5,076	Do.
9	13.5	2,730	12,285	Do.
11	34.0	6,230	23,674	Do.
12	57.0	8,300	29,880	Do.
13	78.7	10,290	39,064	Do.
14	95.4	12,260	47,814	Do.
15	130.5	14,000	67,200	Do.
16	148.3	15,000	72,000	Do.
18	175.7	12,700	50,800	Do.
19	190.9	13,650	54,600	Do.
21	226.4	14,150	62,260	Do.
23	244.8	15,600	67,080	Do.
25	265.4	14,200	55,380	Do.
27	297.5	13,750	59,125	Do.

In this experiment the *Colpidium* increased in numbers until a maximum was reached on about the sixteenth day. The oxygen depletion of 148.3 parts per million observed on the sixteenth day slowly increased to 297.5 parts per million on the twenty-seventh day, although there was no further increase of the *Colpidium*.

When inoculated with *Bact. aerogenes* in pure culture, the 5-day oxygen demand of this medium, containing 5,000 mg. each of dextrose and peptone per liter, is about 3,000 parts per million. To obtain additional information in regard to the oxygen demand of this medium a portion of the medium in which the *Colpidium* had been growing for 27 days was removed and inoculated with the heterogeneous flora and fauna found in polluted river water. An additional oxygen depletion of 6,880 parts per million after 5 days and 8,350 parts per million after 10 days was observed. At the time the above portion of the medium was removed to determine its residual oxygen demand in the presence of a combination of bacteria and plankton, the remaining *Colpidium*-only portion in the container was treated with sufficient acid to kill the *Colpidium*. No further loss of oyxgen was observed in this portion.

In the light of these observations it seems logical to conclude that the oxygen depletions produced by the growth of *Colpidium*, in the absence of bacteria, are only a small portion of that observed in the presence of bacteria or of combinations of bacteria and plankton.

OXIDATION BY PURE CULTURES OF BACTERIA AND OF PLANKTON GROWING TOGETHER

In this part of the study with plankton and bacteria growing together, each in pure culture, the greater portion of the work has been done with the combination of *Bact. aerogenes* and *Colpidium*, inasmuch as the oxygen depletions produced by each of these organisms, when growing individually in pure culture, have been rather definitely established. These tests were made with the same dilute dextrose-peptone solution and with exactly the same technique as that employed in the studies reported above. In almost every instance the pure culture bacteria experiments and the bacteria and plankton combination experiments were run in parallel. Two exactly duplicate portions of the dilute medium were prepared and each was inoculated with the same amount of bacterial suspension. One of these portions was also seeded with a definite amount of an active *Colpidium* culture. Usually a similar amount of the *Colpidium* culture was killed by heat and added to the portion containing bacteria in pure culture in order that there might be no question as to the exact duplication of the oxidizable material present in the two series. Thereafter each of the two portions was thoroughly mixed and distributed to sterile dissolved oxygen bottles for subsequent study.

In these tests with *Bact. aerogenes* and *Colpidium* growing together, examinations were made, usually in duplicate, at regular intervals, to determine (1) the number of *Bact. aerogenes* per c. c., (2) the number of cubic standard units of *Colpidium* per c. c., (3) the extent of oxygen depletion, and (4) whether any organisms other than *Bact. aerogenes* or *Colpidium* had gained entrance to the bottles. In a few instances bottles were found, after the fifth day of storage, which contained extraneous organisms. The results obtained from such bottles were excluded.

Ten such experiments with *Bact. aerogenes* and *Colpidium* have been completed. The results obtained in each experiment, together with the average of the 10, are presented in Table 8. The A, B, and C sections contain, respectively, the bacteriological, the plankton, and the oxygen data.

TABLE 8.—*Bacteria and Colpidium counts and oxygen depletions observed in dilute dextrose-peptone solutions incubated at 20° C., when inoculated with Bact. aerogenes and Colpidium, each in pure culture*

Time, in days	Experiment No.										Average
	5	6	7	8	15	16	17	23A	23B	23C	
A. BACT. AEROGENES PER C. C.											
0	4,300,000	92,000	240,000	1,030,000	622,000	422,000	90,000	350,000	350,000	350,000	781,000
						359,000	75,000				
1	15,000,000	4,900,000	6,800,000	6,100,000	6,700,000	7,750,000	4,250,000	6,800,000	6,400,000	5,100,000	6,940,000
	9,650,000	6,200,000	6,400,000	7,000,000	6,900,000	8,800,000	5,700,000	6,100,000	6,900,000	5,300,000	
2	1,080,000	6,250,000	6,150,000	4,500,000	4,800,000	9,200,000	6,600,000	6,500,000	5,900,000	6,200,000	6,050,000
	2,080,000	6,700,000	7,350,000	3,760,000	6,900,000	10,100,000	6,900,000	7,400,000	6,800,000	5,900,000	
3	650,000	5,900,000	5,700,000	270,000	[1] 5,850,000	8,700,000	10,700,000	670,000	4,200,000	4,650,000	4,522,000
	350,000	5,700,000	4,800,000	220,000		9,200,000	8,300,000	520,000	2,500,000	5,700,000	
4	[1] 565,000	5,400,000	4,500,000	365,000	6,200,000	5,700,000	[1] 5,120,000	190,000	260,000	6,500,000	3,170,000
		3,750,000	3,280,000	354,000	5,500,000			130,000	90,000	4,100,000	
5	570,000	730,000	590,000	340,000	3,520,000	5,700,000	890,000	[1] 132,000	[1] 160,000	[1] 2,880,000	1,640,000
	690,000	2,450,000	700,000	315,000	3,640,000		585,000				
6	845,000	780,000	1,210,000	500,000	870,000	[1] 5,000,000	1,280,000	159,000	176,000	450,000	1,060,000
	805,000	370,000	1,140,000	350,000	420,000			48,000	115,000	420,000	
					660,000						
7	480,000	380,000	1,380,000	194,000	560,000	4,300,000	760,000	238,000	149,000	690,000	873,000
	219,000	415,000	795,000	266,000	720,000			238,000	247,000	390,000	
8	635,000	475,000	485,000	175,000	980,000	3,600,000	680,000	47,000	129,000	530,000	793,000
	570,000	660,000	865,000	210,000				39,000	41,000	470,000	
10 [2]	450,000	810,000	930,000	331,000	700,000	2,770,000	520,000	218,000	340,000	339,000	[2] 705,000
		510,000	490,000	347,000							
15 [3]	366,000	372,000	476,000	237,000	805,000	2,100,000	....	63,500	158,000	330,000	[3] 545,000

[1] Calculated figure mean of preceding and following results.
[2] Includes results of ninth to eleventh days.
[3] Includes results of thirteenth to sixteenth days.

Table 8.—*Bacteria and Colpidium counts and oxygen depletions observed in dilute dextrose-peptone solutions incubated at 20° C., when inoculated with Bact. aerogenes and Colpidium, each in pure culture*—Continued

Time, in days	Experiment No. 5	6	7	8	15	16	17	23A	23B	23C	Average
B. COLPIDIUM PER C. C. IN CUBIC STANDARD UNITS											
0	7.0	10	10.0	10	40	6	5	0.5	1	2	9.2
1	71.0	6	4.0	14		0	0	7	7	1	12.4
						0	0	4	12	0	
2	443.0	9	22.3	423	3	8	24	36	30	68	108.7
						8	16	33	104	48	
3	804.0	48	156.0	720	[1] 78	158	220	3,367	320	320	511.8
						65	380	1,116	472	204	
4	[1] 404.0	93	456.0	102	164	360	[1] 700	1,120	1,410	660	538.2
		438	440.0	72	144			830	1,485	420	
5	3.0	459	456.0	92	304	685	960	[1] 817	[1] 944	[1] 560	535.0
		414	552.0	51	152		1,242				
6	7.5	240	512.0	498	290	[1] 461	384	762	382	614	358.8
		56	288.0	9	214			556	500	548	
7	48.0	12	176.0	344	10	237	56	66	176	424	149.6
		6	204.0	8	8			268	216	392	
8	37.0	15	12.0	64	[1] 8	248	108	102	24	98	88.0
		22	20.0	54				294	50	124	
10 [2]	19.0	6	12.0	6	5	191	0	27	30	26	[3] 33.1
		27	12.0	4							
16 [2]	74.0	19	51.0	6	1	85		15	4	15	[3] 30.0

C. OXYGEN LOSS IN P. P. M.

1		2.37	2.64	2.32		2.80	2.77	2.24	2.19	2.27	2.42
2	3.95	2.82	2.60	2.67	2.40	2.53 3.78	2.79 4.22	2.21 2.40	2.27 2.68	2.03 3.67	3.15
3	4.32	2.69	2.63	3.40	2.89 [1] 2.84	3.64 3.89	4.33 5.11	2.40 4.14	2.67 3.78	3.27 4.31	3.76
4	[1] 4.48	3.13	2.88	3.35		3.79 4.29	5.64 [1] 6.54	4.11 5.54	4.20 5.11	4.47 4.83	4.33
5	4.65	3.17 4.99	2.83 3.27	3.54 3.48	2.78	4.77	7.64	5.46 [1] 5.89	5.48 [1] 5.78	5.12 [1] 5.56	4.86
6	4.47	3.21 3.54 4.50	3.53 3.30 4.93	3.66 5.51 3.82	3.10	[1] 5.34	7.79 7.69	6.29 6.27	6.09 6.44	5.85 6.44	5.24
7	4.52	3.38	3.16	5.32	3.40 3.51 3.50	5.90	8.48	6.50	6.63	6.41	5.38
8	5.05	3.38 3 43	3.69 4.05	3.59 4.99	3.76	6.24	8.39	7.05 7.57	6.84 6.61	6.82 6.81	5.74
10 [2]	4.58	5.04 3.19	3.78 3.54	5.21 3.62	3.56	6.91	8.40	6.90 6.98	6.84 7.32	6.63 7.44	[2] 5.59
15 [3]	5.02	3.90 3.89	3.75	3.69 5.08	3.88	7.47	8.52	7.25	6.93	7.14	[3] 5.89

[1] Calculated figure mean of preceding and following results.
[2] Includes results of ninth to eleventh days.
[3] Includes results of thirteenth to sixteenth days.

The results obtained with *Bact. aerogenes* and *Colpidium* growing together in the test medium appear to warrant the following deductions:

(1) The bacteria increased very rapidly in numbers to a limiting figure of about seven millions per c. c. during the first 24 hours.

(2) The *Colpidium* increased slowly, requiring three to six days to reach their limiting number. (The incidence of the *Colpidium* growth was apparently favorably influenced by increases in the initial bacterial density.)

(3) Coincident with or immediately following the increase of the *Colpidium*, the observed bacterial count began to decrease. By the time the *Colpidium* had reached its limiting number, the bacteria had been reduced about one-half, and thereafter both the bacteria and the *Colpidium* decreased.

(4) The absorption of oxygen proceeded at a rapid rate while the bacteria were in an observed state of active increase.

(5) In the experiments with bacteria and plankton growing together the absorption of oxygen continued not only after the limiting number of bacteria had been reached but also after the limiting volume of *Colpidium* was observed. This was not the case in the pure culture experiments with bacteria alone. Here the absorption of oxygen practically ceased when the limiting number of bacteria was reached.

These deductions and comments may be understood better by referring to Figures 1 and 2, which portray graphically the average results presented in Tables 2 and 8. Figure 1 presents the biological results and Figure 2 the corresponding oxygen depletions.

If biochemical oxidation be effected only by growing cells, then it is necessary to conclude that actual multiplication of the bacteria occurred continuously in these experiments, although the observed number of bacteria present was for the greater part of the time continuously decreasing.

It has been shown that in a more concentrated medium the *Colpidium* is able to take on sufficient food to stimulate growth in the absence of bacteria, and this organism is not able to do this in the dilute medium. Since *Colpidium* did grow well in the dilute medium in the presence of bacteria and a marked decrease in bacterial numbers was observed, it seems reasonable to conclude that the bacteria, by absorbing the food and thus concentrating it in their own bodies, became a sufficient food in themselves to stimulate the growth of *Colpidium*. Thus the bacteria may be said to be "concentrators" or "condensers" of the dilute food material.

It may be assumed, under the conditions of these tests, that *Colpidium* was responsible for the marked decrease in bacterial numbers. This assumption is supported by the earlier studies of Purdy and Butterfield (loc. cit.). With the bacterial population reduced below its limiting number by the inroads of the plankton, the bacteria would be stimulated to maintain continuous growth.

On the basis of these considerations the function of the plankton in the biochemical oxidation process is to maintain the bacterial population below its limiting number. As a result, compensatory bacterial multiplication is stimulated and a continuation of the oxi-

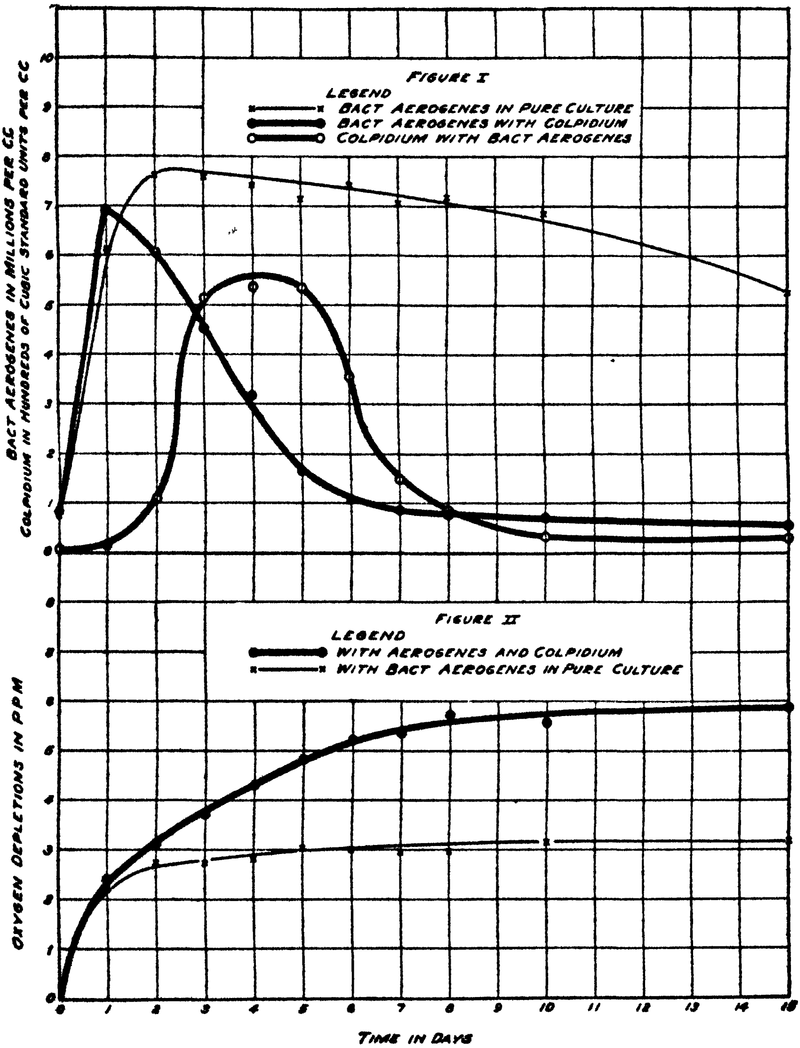

FIGURE I.—Bacteria and *Colpidium* counts in dilute dextrose-peptone solution incubated at 20° C. when inoculated with (1) *Bact. aerogenes* in pure culture and (2) *Bact. aerogenes* and *Colpidium* growing together in pure culture. Average of 10 experiments

FIGURE II.—Oxygen depletions observed in dilute dextrose-peptone solution incubated at 20° C. when inoculated with (1) *Bact. aerogenes* in pure culture and (2) *Bact. aerogenes* and *Colpidium* each in pure culture. Average of 10 experiments

dation phenomenon is obtained. As the limiting number of organisms decreases with the food supply, the numbers of *Bact. aerogenes* and of *Colpidium* decrease as the residual food supply is continuously lessened by their continuous growth.

OXIDATION BY MIXED CULTURES OF BACTERIA AND OF PLANKTON GROWING TOGETHER

Determinations were next made of the oxidation induced in the dilute medium by more complex biological cultures, using for this purpose (1) mixed cultures of bacteria with a pure culture of *Colpidium*, (2) mixed cultures of bacteria with pure cultures of other plankton, (3) complex natural flora and fauna of river water.

(1) *Mixed cultures of bacteria with a pure culture of Colpidium.*—After investigating the effect of a single species of bacteria and of plankton developing symbiotically in the dilute dextrose-peptone solution, the complexity of the biological factors was increased by putting additional bacterial species in the inoculation, with the plankton limited to *Colpidium*. Using the standardized procedure, four experiments [3] were completed with this biological combination. The results obtained are presented in Table 9.

TABLE 9.—*Bacteria and Colpidium counts and oxygen depletions observed in dilute dextrose-peptone solution incubated at 20° C., when inoculated with bacteria in mixed culture and with Colpidium*

Time, in days	Experiment No.				Average
	62	63	60	61	
A. BACTERIA PER C. C.					
0	3,870	4,010	5,350	7,900	5,280
1	8,380,000	6,720,000	4,375,000	5,250,000	6,180,000
2	5,950,000	8,600,000	7,520,000	6,620,000	7,170,000
3	4,190,000	7,900,000	6,120,000	5,800,000	6,000,000
4	[1] 2,380,000	[1] 6,000,000	5,720,000	6,420,000	5,130,000
5	585,000	4,090,000	905,000	5,580,000	2,790,000
7	505,000	1,600,000	344,000	4,040,000	1,620,000
9	725,000	1,610,000	253,000	1,040,000	907,000
10	662,000	1,630,000	130,000	422,000	711,000
15	605,000	1,620,000	68,800	266,000	640,000
B. COLPIDIUM IN CUBIC STANDARD UNITS PER C. C.					
0	2	2	5	5	4
1	9	16	5	1	8
2	446	157	47	14	166
3	1,018	1,218	310	29	644
4	[1] 1,622	[1] 1,918	760	261	1,140
5	2,225	2,618	1,369	423	1,659
7	1,075	2,062	1,280	408	1,206
9	862	1,294	1,425	396	994
10	1,975	1,285	1,010	548	1,204
15	2,874	732	1,351	534	1,373
C. OXYGEN LOSS IN P. P. M.					
1	3.37	3.16	1.84	2.85	2.80
2	3.62	3.78	2.99	4.02	3.60
3	4.43	4.30	3.26	4.37	4.09
4	[1] 4.84	[1] 4.72	3.45	4.77	4.44
5	5.24	5.14	4.54	5.82	5.18
7	5.58	5.64	5.57	6.46	5.81
9	5.68	6.38	5.92	6.83	6.20
10	6.19	6.86	5.32	6.69	6.26
15	6.82	6.94	6.29	6.92	6.74

[1] Calculated figure, mean of preceding and following results, used for average.

[3] These experiments were made in parallel with tests where the same bacteria were included in the inoculation but the plankton excluded. For these companion bacteria-only studies, reference is made to Table 4, Experiments 60, 61, 62, and 63 and the accompanying discussion

Inspection of the data presented in these tables shows that they are in good agreement with the results obtained with bacteria and plankton, each in pure culture and growing together. One difference is noted, however, namely, that the extent of deoxygenation observed is greater than has obtained in any of the previous experiments, although the medium is exactly the same. This is also in agreement with previous observations; for each time the complexity of the biological inoculation has been increased, the extent of deoxygenation also has been increased.

(2) *Mixed cultures of bacteria with pure cultures of plankton, other than Colpidium.*—While efforts to secure plankton other than *Colpidium* in bacteria-free culture were unsuccessful, as has been previously explained, and this failure prevented any study of their direct effects in bacteria-free culture, it did not prevent observations on the extent of oxidation by such plankton growing in mixed cultures of bacteria.

An experiment was conducted using the dilute dextrose-peptone solution inoculated with a very small flagellate (about 5 microns in diameter) and with bacteria. This plankton culture, prior to its use in these experiments, had been perpetuated through a large number of transfers on growths of *Bact. aerogenes*, and it is probable for this reason that all of the bacteria active in these tests were *Bact. aerogenes*. At least no other bacteria were observed. This experiment was repeated three times. The average results obtained are presented in Table 10.

In studying these results it is noted that no considerable reduction in bacterial numbers took place in the presence of the minute flagellate, such as occurred in the presence of the larger ciliate *Colpidium*. The reason for this is not known. It may be that the flagellate does not feed, or feeds to a limited extent only, on bacteria, or it may be that with this combination the biological balance was so adjusted that the death and birth rates of the bacteria were approximately the same.

TABLE 10.—*Bacteria and flagellate counts and oxygen depletions observed in dilute dextrose-peptone solution when inoculated with Bact. aerogenes and a small flagellate and incubated at 20° C. (average of three experiments)*

Time, in days	Bacteria per c. c.	Flagellates per c. c.	Oxygen depletion in p. p. m.	Time, in days	Bacteria per c. c.	Flagellates per c. c.	Oxygen depletion in p. p. m.
0	381,000	70		5	6,940,000	2,050	3.91
1	6,840,000	70	2.09	8	6,370,000	18,400	4.20
2	7,380,000	700	3.02	10	5,960,000	2,020	4.29
3	6,920,000	850	3.34	15	6,280,000	2,020	4.77

It is observed that the extent of deoxygenation was approximately the same as when the combination of *Bact. aerogenes* and *Colpidium* was used. As with *Colpidium*, the extent of deoxygenation was greater with bacteria plus flagellates than with bacteria alone. Similarly the difference became apparent only after one to two days of storage.

In attempting to determine the extent of oxidation effected by a mixed culture of bacteria and *Paramecium*, it was discovered that this plankton organism would not grow in the dilute media under any of the conditions of test. After considerable experimentation it was found that this protozoon would thrive (1) in any dilute medium with a satisfactory hydrogen ion and mineral salt content, providing very large numbers (1,000,000,000 or more per c. c.) of average-sized bacteria were added from growths [4] on solid media, and (2) in a medium sufficiently concentrated to produce naturally a bacterial maximum of 100,000,000 or more per c. c., provided this medium also contained minute suspended particles of organic material such as are found in an average domestic sewage.

Sterilized sewage affords a medium of this latter type. Sterilized sewage was accordingly inoculated with a mixed culture of bacteria which also contained *Paramecium*. Working with such a concentrated medium, it was necessary to use the aeration apparatus previously described by Theriault and Butterfield (loc. cit.) in order to maintain aerobic conditions and to determine the extent of the oxygen depletion. The sample was incubated at 20° C. and examinations were made at frequent intervals for 28 days. The results of the observations are presented in Table 11.

TABLE 11.—*Bacterial counts, Paramecium counts, and oxygen depletions observed in sterilized domestic sewage incubated at 20° C., when inoculated with a mixed culture of bacteria and with Paramecium*

Time, in days	Bacteria per c. c.	Oxygen loss in p. p. m.	Paramecium per c. c.		Time, in days	Bacteria per c. c.	Oxygen loss in p. p. m.	Paramecium per c. c.	
			Individuals	Cubic standard units				Individuals	Cubic standard units
0	92,000	----------	0.3	21	11	234,000,000	219.1	65	3,650
1	270,000,000	107.8	0	0	12	117,000,000	231.3	206	11,080
2	358,000,000	145.4	0	0	14	12,200,000	278.8	1,050	42,150
3	----------	186.2	0	0	15	6,300,000	281.9	1,790	76,970
4	310,000,000	199.8	0	0	16	2,870,000	295.5	1,450	62,350
5	----------	206.3	0	0	18	1,560,000	307.6	1,240	53,370
7	107,000,000	215.4	[1] 1	[1] 70	22	1,610,000	339.2	800	16,000
8	134,000,000	212.8	3	210	25	1,180,000	331.9	650	13,000
9	190,000,000	206.6	6	350	28	900,000	343.7	425	10,620
10	221,000,000	226.6	15	1,050					

[1] Fearing that all *Paramecium* had died out, an additional inoculation was added this day.

[4] It was necessary to add the bacterial numbers in this manner for it is not possible to produce such large numbers of bacteria in dilute media by natural multiplication in it.

While definite quantitative comparison can not be made between the results secured in this experiment with *Paramecium* and those obtained with other organisms, because the medium employed was not the same, the data are nevertheless of considerable interest because of certain similarities in the results. For instance, it is noted that during the period of increase in bacterial numbers (0 to 3 days) large amounts of oxygen were consumed. After the limiting number of bacteria had been reached and prior to the time when an increase in *Paramecium* was observed (fourth to eleventh days) very little oxygen was used up. Thereafter when *Paramecium* increased appreciably, a marked decrease in bacterial numbers occurred and extensive consumption of oxygen was again observed. The oxidation process also continued after *Paramecium* began to decline in numbers. These observations are in good agreement with those based on the studies with other organisms and tend to support the proposed theory of the rôle of the plankton in the deoxygenation process.

(3) *Results with complex natural flora and fauna of river water.*—Thus far the biological and oxygen changes occurring in the medium have been determined when it was inoculated with bacteria and with plankton, in pure culture, and with limited mixtures of the two types of life. Observations were also made of these changes when the medium was inoculated with such heterogeneous combinations of bacteria and of plankton as are normally found in polluted river water and sewage. Four such experiments, Nos. 33, 42, 44, and 45 have been completed. The procedure and the technique employed were identical with those used in the previous experiments. In experiments 33 and 45 the dilute dextrose-peptone solution containing 5.0 mg. each of dextrose and peptone per liter, was used. In experiments 42 and 44 the amounts of dextrose and peptone were increased to 50.0 mg. of each per liter of medium, which concentration required the use of the aeration method during incubation. The amount of raw river water added per liter of medium as an inoculum in each experiment was as follows: In experiment 33, 20 c. c.; in experiment 42, 5 c. c.; in experiment 44, 20 c. c.; and in experiment 45, 2 c. c.

In all cases the samples, both with the experiments carried on by the aeration procedure and by the excess oxygen dilution method, were incubated at a temperature of 20° C. The usual examinations were made at regular intervals. The results are presented in Table 12.

TABLE 12.—*Bacterial counts, plankton counts, and oxygen depletions observed in dextrose-peptone solution inoculated with all the bacteria and plankton in river water and incubated at 20° C.*

Time, in days	In a solution containing 50 mg. each of dextrose and peptone per liter						In a solution containing 5.0 mg. each of dextrose and peptone per liter						
	Experiment No. 42			Experiment No. 44			Experiment No. 33			Experiment No. 45			Average oxygen loss for experiments Nos. 33 and 45
	Bacteria per c. c.	Plankton [1]	Oxygen loss in p. p. m.	Bacteria per c. c.	Plankton [1]	Oxygen loss in p. p. m.	Bacteria per c. c.	Plankton [1]	Oxygen loss in p. p. m.	Bacteria per c. c.	Plankton [1]	Oxygen loss in p. p. m.	
0	50	244		2, 200	4		7, 460	Tr.		37, 000	Tr.		
1	6, 200, 000	1	18. 05	16, 500, 000	56	12. 06	525, 000	9	0. 64	6, 400, 000		2. 07	1. 36
2	22, 200, 000		38. 64	70, 500, 000	60	32. 14	4, 850, 000	10	4. 96	13, 200, 000		4. 42	4. 69
3	9, 400, 000	55	47. 59	74, 000, 000		35. 86	6, 000, 000	11	5. 68	20, 800, 000		4. 68	5. 18
4	14, 300, 000	5, 372		5, 300, 000	13, 792	50. 20				20, 400, 000		4. 91	5. 84
5	13, 700, 000	7, 645	60. 85	750, 000	20, 200	62. 87	122, 000	448	7. 83	18, 000, 000		4. 93	6. 38
6	770, 000	10, 750	71. 55	213, 000	10, 020	65. 67	171, 000	1, 790	8. 82	18, 800, 000	220	5. 26	7. 04
7	2, 400, 000	6, 630	77. 39				397, 000	488	9. 56	11, 600, 000	170	5. 96	7. 76
9		5, 750	83. 31	51, 000	4, 315	70. 30	230, 000	308	9. 87				
10	470, 000	6, 100	85. 00		2, 780		270, 000	432	10. 28	21, 900, 000		5. 40	7. 84
15	125, 000	665	92. 52	54, 000	2, 004	76. 50	130, 000	78	10. 64	2, 160, 000	913	8. 14	9. 37
20	60, 000	462	96. 56	13, 600		76. 92	36, 400	78	11. 27	425, 000	100	9. 02	10. 14
25	222, 000	512	98. 97	6, 930	6, 350	80. 64	18, 400	113	12. 07	403, 000	42	9. 14	10. 60
30				18, 800		83. 46	11, 400	51	11. 92	369, 000	76	8. 74	10. 33
35	45, 000	275	101. 30	7, 900		84. 24	8, 560	56	12. 45	725, 000	82	9. 56	11. 00
40	24, 800	384	104. 90	5, 350	18	86. 02	8, 520	27	12. 18	133, 000	22	9. 38	10. 78
45	14, 600	213	102. 70	9, 350	220	85. 72							
50	28, 400	460	114. 60	22, 600	288		4, 280	18	12. 71	79, 500	14	9. 67	11. 19
55	13, 900	370	125. 40	85, 000	172	86. 31	3, 100	40	12. 48				
60	21, 600	180	130. 40	15, 800	338	88. 17							
65	62, 000	695	135. 80	8, 950		88. 10	735	25	13. 02	59, 200	30	11. 77	12. 40

[1] Expressed in cubic standard units per c. c.

An inspection of these results discloses that the bacteria and plankton histories in these experiments are in good agreement with those obtained in the preceding studies when plankton were included in the bacterial inoculations added. Active multiplication of the bacteria occurred and continued until a limiting number was reached. Coincident with this limiting number an increase in the plankton content began and the bacteria decreased rapidly in numbers. Subsequently the plankton also showed a rapid decline. The biological growths were much more extensive and regular in media containing larger amounts of dextrose and peptone, as would be expected.

The oxygen depletions obtained in these experiments agreed with those in the preceding studies in all respects except one—that is, the extent of the oxygen depletions observed in the dilute dextrose-peptone solution, subjected to the activities of this more complex inoculation, was much greater than in any of the previous experiments where the inoculation added had been limited. In fact, the extent of oxidation was so great that in Experiments 33 and 45, where the test was made by the excess oxygen method, there was danger that the samples might become entirely depleted of oxygen after the sixth day of storage. To eliminate this danger the samples were removed from the incubator on the fifth day, and immediately following the examination for this day they were pooled in a common container and thoroughly aerated. The reaerated mixture was then siphoned to bottles, again examined, and returned to the 20° C. incubator.

THE INFLUENCE OF VARIATIONS IN THE COMPLEXITY OF THE BIOLOGICAL FACTORS ON THE OBSERVED OXYGEN DEPLETION

The effect of variations in the complexity of the biological factors on the life histories of the organisms present has been fairly definitely demonstrated. Attention has also been called to the variations in the oxygen depletion exhibited in a medium of constant composition resulting from the activities of the several organisms and combinations of organisms which have been tried. In order to give a better understanding of these variations in the oxygen results observed under such conditions, all of these average data have been summarized in Table 13. This table includes the average oxygen depletion figures from Tables 2, 4, 8, 9, and 12. A better conception of the differences in the rate and extent of oxidation observed, when the dilute solution was subjected to these various inoculations, may be obtained by referring to Figure 3, which has been prepared from the data presented in Table 13.

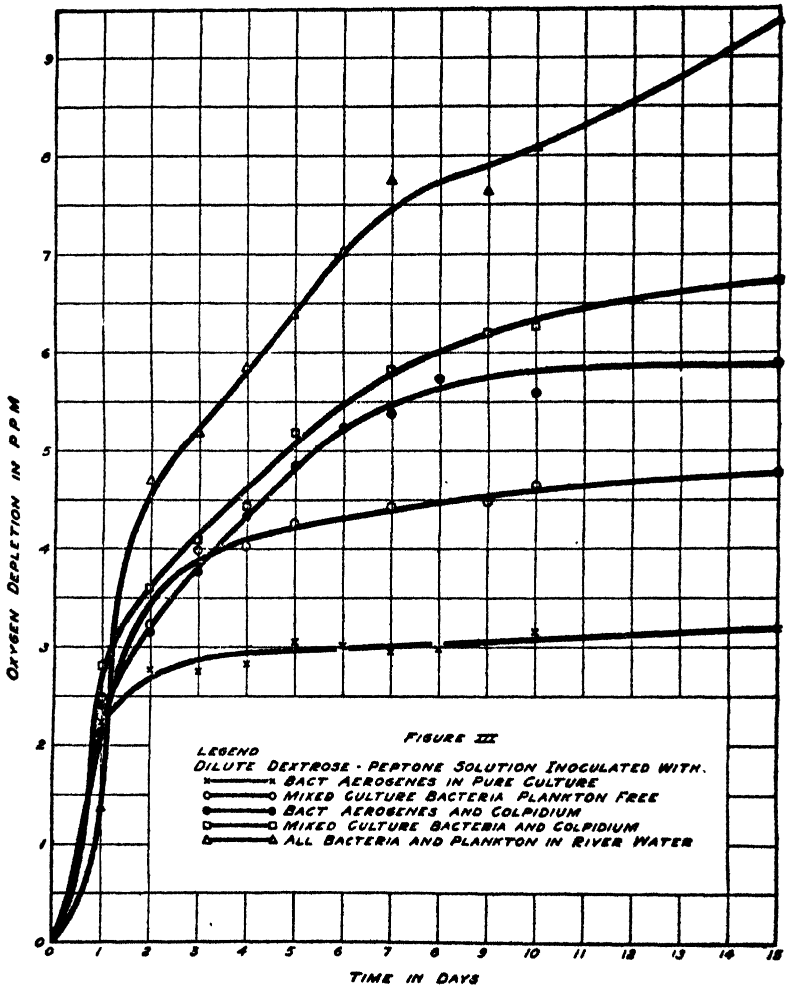

FIGURE III.—Oxygen depletions observed at 20° C. when the dilute dextrose-peptone solution was seeded with inoculations which varied in their biological complexi

TABLE 13.—*Average oxygen depletions observed at 20° C. when the dilute dextrose-peptone solution was acted upon by inoculations which varied in their biological complexity*

Time, in days	Oxygen loss with varying biological inoculations, as follows—				
	Bact. aerogenes in pure culture	Mixed culture bacteria free from plankton	Bact. aerogenes plus Colpidium	Mixed culture bacteria plus Colpidium	All bacteria and plankton in raw river water
1	2.24	2.49	2.42	2.80	1.36
2	2.77	3.23	3 15	3 60	4.69
3	2.75	3.99	3 76	4.09	5.18
4	2.83	4.02	4.33	4.44	5.84
5	3.05	4.26	4 85	5.13	6.38
6	3.02		5 24		7.04
7	2 95	4.43	5 38	5.81	7.76
8	2.97		5 74		
9		4.48		6.20	
10	3.16	4 65	5.59	6.26	7.84
15	3.19	4.77	5.89	6.74	9.37
20					10.14
30					10.33

Judging from the results presented in this table and figure, the complexity of the inoculation introduced into the medium has but very slight effect on the rate of oxidation during the first day or two of incubation. When the extent of oxidation produced is considered, however, an entirely different condition is observed. The most simple inoculation it was possible to employ, a pure culture of bacteria, gave rise to the smallest oxygen depletion; the most complex inoculation tried, all of the organisms present in a fresh sample of river water, gave the greatest oxygen depletion. The deoxygenation produced by the other combinations of organisms tried, graded between these two extremes according to the complexity of the inoculations.

EXPERIMENTS BEARING ON THE VALIDITY OF THE PROPOSED THEORY REGARDING THE RÔLE OF THE PLANKTON

In discussing the studies presented in this paper, the theory has been advanced that the function of the plankton in the biochemical oxidation process is to maintain the bacterial population below its saturation point, or limiting number, by feeding upon the bacterial cells. It was suggested that this reduction of the bacteria permitted the remaining cells to maintain continuous multiplication and the oxidation phenomenon was continued as long as the residual food supply was sufficient to support growth. If this theory of the function of the plankton is correct, then it would follow that other methods of reducing the bacterial count below the saturation point, such as (*a*) filtration through a Berkefeld filter, (*b*) chlorination, or (*c*) partial sterilization by heat, should produce a similar effect, though not an identical one because the reduction in bacterial numbers by such procedures

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would be instantaneous and not continuous. Therefore, it will be of interest now to consider some experiments performed to test the validity of the theory that has been advanced to explain the action of the plankton.

(A) REDUCTION OF BACTERIAL NUMBERS BY FILTRATION THROUGH A BERKEFELD FILTER

In these experiments dilute dextrose-peptone solution, inoculated with a pure culture of *Bact. aerogenes*, was used. The standard procedure previously described was followed. The samples were incubated at 20° C. until the limiting number of bacteria had been reached. A number of bottles selected at random were then removed from the incubator and filtered through a sterile Berkefeld filter into a sterile container. A small amount of unfiltered sample was added to the sterile filtrate to restore the original inoculation. The filtrate was then shaken thoroughly to distribute the inoculation and to restore the dissolved oxygen content before it was again siphoned, with due precuation to maintain the purity of the inoculation, to sterile dissolved oxygen bottles and returned to 20° C. incubation. Immediate and subsequent examinations were made, not only to determine any change in the bacteria and dissolved oxygen contents, but also to establish the absence of any bacteria, other than *Bact. aerogenes*. Eight such experiments were performed. The individual results together with the average are presented in Table 14.

TABLE 14.—*Bacterial counts and oxygen depletions observed in dilute dextrose-peptone solution inoculated with a pure culture of Bact. aerogenes, when the bacterial numbers have been markedly reduced by partial filtration through a Berkefeld filter, after the limiting number had been attained*

Time after filtration, in days	Experiment No								Average
	4	5	6	7	8	14	19A	19B	
A BACTERIA PER C. C. AFTER FILTRATION									
0	17,400	13,100	7,850	8,800	21,100	248,000	2,100	2,400	39,800
						245,000			
1	610,000	980,000	208,000	420,000	1,090,000	490,000	740,000	220,000	595,000
2	720,000	1,270,000	410,000	230,000	1,730,000	770,000	4,900,000	7,800,000	2,230,000
5	8,500,000	2,590,000	1,680,000	245,000	3,490,000	10,600,000	5,750,000	5,700,000	4,190,000
7 [1]		2,750,000	980,000	430,000	3,010,000	7,900,000	4,300,000	890,000	[1] 2,890,000
10 [2]		2,640,000	960,000	230,000	1,760,000	6,500,000	2,330,000	660,000	[2] 2,140,000
							2,280,000	520,000	
B. OXYGEN LOSS IN P. P. M. AFTER FILTRATION									
0	2.81	3.23	2.50	2.75	2.54	2.98	2.32	2.24	[3] 2.67
1	3.27	3.77	2.58	2.94	3.05	3.82	3.11	2.92	3.12
2	4.01	5.37	3.14	3.12	3.68	4.10	3.83	5.63	4.11
5		8.02	7.86	3.28	5.38	5.09	4.85	5.99	5.87
7 [1]		8.24	7.43	3.92	5.31	5.89	5.27	6.04	[1] 6.01
10 [2]		8.30	7.00+	4.50	5.65	6.47	5.45	6.32	[2] 6.24

[1] Includes results obtained at sixth to eighth days.
[2] Includes results obtained at ninth to twelfth days.
[3] Oxygen demand observed prior to filtration

These average results are also presented in Figure 4. Included in this figure are the bacterial and the oxygen depletion results (1) in the samples prior to filtration, and for purposes of comparison (2) in the control samples which were retained unfiltered.

An examination of these results shows that a secondary period of bacterial multiplication and of oxygen absorption was invariably

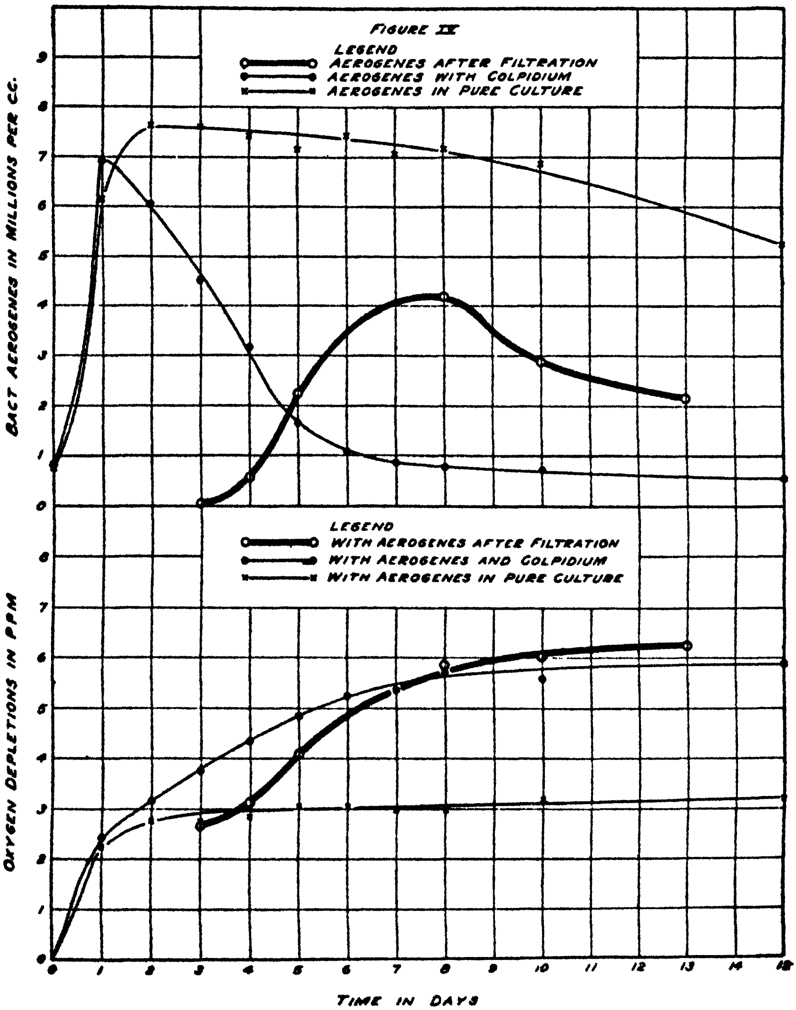

FIGURE IV.—Bacterial counts and oxygen depletions in reinoculated Berkefeld filtrate of *Bact. aerogenes* culture. Light lines give like data of unfiltered culture

observed. In fact, the average oxygen depletion obtained by this procedure is slightly in excess (6.24 as against 5.89 parts per million) of that produced by *Bact. aerogenes* and *Colpidium*, growing together in the same medium. These results tend to support the conclusion which was reached in regard to the function of the plankton.

It is recognized that filtration through the Berkefeld is a rather drastic procedure in that volatile substances may be removed and other materials may be adsorbed in the filter. However, aside from the removal of products detrimental to bacterial growth, the effect of the process would be opposed to the increased growth and resultant oxidation observed, for in filtration the tendency would be to decrease rather than to increase the concentration of food in the medium.

Two types of experiments were tried as controls on this possible effect of Berkefeld filtration—(1) filtration through hard filter paper, in which the adsorptive effect would presumably be slight, and (2) the exposure of the medium to suction, accompanied by vigorous agitation, similar to the suction applied during the filtration process.

The results obtained by filtration through hard filter paper were not satisfactory, because bacterial reductions obtained by such filtration were less than 15 per cent. Consequently, but little opportunity was offered for bacterial multiplication. Whether or not this slight reduction in bacterial numbers is all that can be expected with filtration through paper, is not known. It is possible that greater reductions were actually obtained and that multiplication of the bacteria took place during the process, for such filtration (through paper without suction) is a slow procedure requiring several hours to filter a quantity sufficient for experimental use. For these reasons no definite interpretation of the results can be made.

The experiments dealing with the application of suction without filtration were more successful. A portion of the samples, selected at random after the limiting number of bacteria had been reached, were poured into a sterile carboy and suction applied similar to that used in the filtration process. During the period of exposure to negative pressure the sample was virgorously shaken. After reaerating, the sample was again siphoned to sterile bottles for initial and subsequent examinations after incubation at 20° C. The results obtained from such an experiment are given in Table 15.

TABLE 15.—*Bacterial counts and oxygen depletions observed in dilute dextrose-peptone solution incubated at 20° C., inoculated with a pure culture of Bact. aerogenes, when suction is applied to a portion of the sample after the limiting number of bacteria has been reached*

Time, in days	Uninterrupted sample		Suction applied on third day of storage, samples then reaerated and treated as controls	
	Bacteria per c. c.	Oxygen loss in p. p. m.	Bacteria per c. c.	Oxygen loss in p. p. m.
0	37,700			
1	5,500,000	1.99		
3	6,300,000	2.98	5,450,000	2.98
4	6,300,000	2.95	5,700,000	2.98
5	4,750,000	3.13	5,050,000	3.48

The results indicate that the application of suction had no effect on the then present or subsequent bacterial activity and that the oxygen depletions observed did not differ significantly from those in the original samples.

(B) REDUCTION OF BACTERIAL NUMBERS BY CHLORINATION

The same medium was used and the same procedure was followed as in the tests with filtration through a Berkefeld filter. After the selected samples had been pooled, sufficient chlorine was added to give a residual of 0.8 parts per million. After mixing thoroughly, this chlorinated composite was allowed to stand thirty minutes. A sufficient quantity of unchlorinated sample was then added to the pool to reduce the chlorine content to 0.02 parts per million. It was thought that this amount would reduce the chlorine below the bactericidal concentration and at the same time would restore the original bacterial inoculation. After thorough mixing, the composite was again siphoned to sterile bottles. New examinations for bacteria and for dissolved oxygen contents were made and the remaining samples were incubated at 20° C. Table 16 contains the results which were obtained from this experiment.

TABLE 16.—*Bacterial counts and oxygen depletions observed in dilute dextrose-peptone solution inoculated with Bact. aerogenes and incubated at 20° C. when a portion of the samples are chlorinated after the limiting number of bacteria has been reached*

Time, in days	Uninterrupted samples		Chlorinated on third day of storage; excess of chlorine removed	
	Bacteria per c. c.	Oxygen loss in p. p. m.	Bacteria per c. c.	Oxygen loss in p. p. m.
0	63,000			
1	5,400,000	1.81		
3	5,200,000	2.82	1,620,000	2.82
4	5,150,000	2.52	3,020,000	3.07
5			6,850,000	4.06
6		2.78		5.09

The results indicate that chlorination was approximately as effective as Berkefeld filtration in providing for a secondary increase in bacterial numbers with an accompanying continuation of oxygen depletion.

(C) REDUCTION OF BACTERIAL NUMBERS BY PASTEURIZATION

The dilute dextrose-peptone solution was inoculated with *Bact. aerogenes* and incubated at 20° C. for seven days. The bacterial history was followed during this period. The entire sample was then pasteurized by holding at 65° C. for one and one-half hours, cooled rapidly to 20° C., and divided into two portions. One portion was

reinoculated with *Bact. aerogenes*, reaerated, and put up in sterile bottles for further study. The second portion was filtered through a Berkefeld filter to remove the dead cells of *Bact. aerogenes* and then was reinoculated, aerated, and treated in exactly the same way as the first portion. Subsequent examinations and control tests were made as in previous experiments. The results are presented in Table 17.

TABLE 17.—*Bacterial counts and oxygen depletions observed in dilute dextrose-peptone solution inoculated with Bact. aerogenes and incubated at 20° C. when the viable bacterial population is reduced by pasteurization and in one portion the dead cells removed by filtration*

Time, in days	Bacteria, per c. c. in original sample	Viable bacterial cells reduced by pasteurization and examination resumed		Viable bacterial cells reduced by pasteurization and dead cells removed by filtration. Examinations resumed	
		Bacteria per c. c.	Oxygen loss in p. p. m.	Bacteria per c. c.	Oxygen loss in p. p. m.
0	100				
1	10,000				
2	3,740,000				
3	5,500,000				
6	6,500,000				
7	6,000,000				
8		45,000		40,000	
9		236,000	0.19	940,000	0.37
10		420,000	.36	1,430,000	1.74
12		375,000	.47	1,320,000	2.16
15		235,000	.40	1,150,000	2.54

The results indicate that pasteurization was effective in reducing the number of viable bacterial cells to a minimum. However, the subsequent increase in bacterial numbers, with its accompanying oxidation, was very slight in portion 1. This was not the case in portion 2, where pasteurization was followed by filtration to remove the dead cells. Here a marked increase in bacterial numbers occurred, with a correspondingly marked increase in oxidation. This leads to the conclusion that in a medium of a given concentration the presence of a definite number of bacterial cells, living or dead, prevents further multiplication; that is, when the medium was pasteurized the cells present were killed but were preserved and remained in suspension, preventing further multiplication. A direct microscopic examination confirmed the presence of these preserved cells. In the case of chlorination this is not true; not only are the cells killed by the chlorine, but the majority of them are also actually lysed by the process and disappear. Thus, the experiments with pasteurization also tend to support the theory that the chief function of the plankton in the biochemical oxidation process is to reduce and remove the bacterial population below the saturation point and thus to provide conditions suitable for continuous multiplication.

SUMMARY

Working with a dilute dextrose-peptone solution which could be readily and accurately reproduced, a series of experiments have been performed that were designed to show the functions of the bacteria and the plankton and the probable interrelationships of the two groups of organisms in the biochemical oxidation process.

The results obtained in these experiments indicate that—

1. The dilute dextrose-peptone solution preserved free from biological activity does not absorb any dissolved oxygen under the conditions of these tests.

2. This solution, when inoculated with bacteria in pure culture, favors their growth, and they increase rapidly in numbers, reaching a limiting population by the second day of incubation. This limiting number is maintained for long periods of time.

3. While the bacteria were actively multiplying, oxygen was depleted at a rapid rate. After the limiting number had been reached, this depletion of dissolved oxygen practically ceased, although the living bacterial population remained quite high.

4. The results observed with mixed cultures of bacteria, free from plankton, were the same as with pure cultures, except that the extent of oxidation was somewhat greater.

5. The protozoon, *Colpidium* grew well in the presence of bacteria in dilute dexrose-peptone solution but was not able to grow in it in the absence of bacteria. When the concentration of food in the medium was increased 100 to 1,000 fold, *Colpidium* grew well in the absence of bacteria. The conclusion is reached that in the dilute medium the bacteria act as "collectors" or "concentrators" of the *Colpidium* food.

6. *Colpidium* growing in pure culture used up oxygen. The amount of oxygen used, however, was comparatively small.

7. When bacteria and plankton were grown together in the dilute dextrose-peptone solution, the results obtained during the first two days of incubation were approximately the same as when bacteria only were present. After the first two days, however, the bacterial numbers were not maintained but were reduced rapidly, the reduction being accompanied by a plankton increase. Moreover, the oxidation process did not cease but continued as in natural polluted waters.

8. In general it can be said that the extent of oxidation observed in the dilute dextrose-peptone solution varied directly with the complexity of the biological factors present—that is, the greater the variety of organisms acting in the medium, the more extensive the oxygen depletion observed.

Based on the results which have been obtained, the theory is advanced that the chief function of certain plankton in the biochemical

oxidation process is to keep the bacterial population reduced below the saturation point and thus to provide conditions suitable for continuous bacterial multiplication, this in turn resulting in more complete oxidation.

Support is given to this theory of the function of the plankton by the results obtained in experiments where the limiting numbers of bacteria were reduced by physical and by chemical means. Such reductions in bacterial numbers were invariably followed by renewed bacterial multiplication and oxidation.

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DEATH RATES IN A GROUP OF INSURED PERSONS

Rates for Principal Causes of Death for December, 1930, and for the Years 1911 and 1920–1930

The accompanying tables are taken from the Statistical Bulletin for January, 1931, issued by the Metropolitan Life Insurance Co. They present the mortality experience of the industrial insurance department of the company, by principal cause of death, for December, 1930, and for the years 1911 and 1920–1930, inclusive. The rates for recent years are based on a strength of approximately 19,000,000 insured persons in the United States and Canada, comprising about one-seventh of the total and about one-third of the urban population of the two countries. While this is a more or less

selected group of persons and is largely urban, the death rate serves as an early index of conditions in the general population. In recent years the general death rates in this group have been averaging about 72 per cent of the death rate for the registration area of the United States.

DECEMBER, 1930

With regard to the record for December, the *Bulletin* states:

December, 1930, registered a lower death rate than any previous December. The rate was 8.4 per 1,000, as compared with 8.9 for December, 1929. While the usual seasonal increase in the mortality rate is in evidence, the rise during recent months has been more moderate than is usual for this period of the year. * * * There was more sickness than in November from influenza, measles, scarlet fever, and smallpox, but there were fewer cases of diphtheria, poliomyelitis, and typhoid fever. Compared with December, 1929, the only diseases which showed increased prevalence in 1930 were poliomyelitis and typhoid fever. These comparisons are based on the number of cases reported during the first four weeks of November and December, 1930, and December, 1929.

Death rates (annual basis) per 100,000 for principal causes of death, December, 1930

[Industrial department, Metropolitan Life Insurance Co.]

Cause of death	Rate per 100,000 lives exposed [1]				
	December, 1930	November, 1930	December, 1929	Year	
				1930	1929
Total, all causes	844.6	765 3	886 8	870 2	934.2
Typhoid fever	2 8	2.6	2 1	2.4	2 4
Measles	1.1	.2	1.8	2 8	3.0
Scarlet fever	1 9	2 0	3 4	2 5	2 7
Whooping cough	2.8	2.3	3.3	4 3	5.7
Diphtheria	6.7	5 7	10 6	5 9	8.8
Influenza	13 2	10 7	20.9	14 7	41.9
Tuberculosis (all forms)	69 5	64 9	75 6	80 5	86.9
Tuberculosis of respiratory system	61 7	57 3	67 5	70 1	76.7
Cancer	79 1	71.3	76 6	77 9	77 6
Diabetes mellitus	17.8	16 1	17 0	18 3	18.3
Cerebral hemorrhage	63 9	55 4	[2] 58 9	60 2	[2] 58.0
Organic diseases of heart	146 9	130 1	147.3	144.3	146 8
Pneumonia (all forms)	75 8	66 6	89 7	75.4	88.6
Other respiratory diseases	11 6	9 3	11.0	10.9	11.7
Diarrhea and enteritis	10.6	19 0	13.0	20.3	20.8
Bright's disease (chronic nephritis)	68 4	60 7	66.9	67.8	69.4
Puerperal state	9 8	8.6	11 6	12 1	13.6
Suicides	9 4	9.6	7.6	9.7	8.5
Homicides	7 1	5 8	7 0	6 7	6 6
Other external causes (excluding suicides and homicides)	59 5	53.5	66.9	62.2	65.2
Traumatism by automobiles	21 4	21 1	21 8	20 7	21.0
All other causes	186.7	171.0	195.6	191.3	197.7

[1] All figures in this table include insured infants under one year of age. The rates for 1930 are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.
[2] Rate not comparable with that for 1930.

YEAR 1930 AND COMPARISON WITH 1911 AND YEARS 1920–1929

The following is a summary of statements contained in the *Bulletin:*

The provisional general death rate in this group of persons for the year 1930 was 8.3 per 1,000, the lowest figure yet recorded. This is 6.6 per cent less than the rate for 1929, and 1.1 per cent less than

that for 1927, when the previous "low" was established. If this rate reflects accurately the condition in the general populations, the health of the country as a whole, as indicated by the death rate, was probably better than for any previous year. The figure for the registration area will, therefore, be awaited with much interest.

With only a few minor exceptions, every disease showed a decided decline during the year, and a considerable number registered a new minimum. Every month but two showed a lower death rate than that for the corresponding month of the preceding year. This favorable condition is said to have prevailed not only in all sections of the United States but in Canada also. It is stated that if the 1911 rate (12.5 per 1,000) had obtained in 1930, there would have been 76,325 more deaths in this group than actually occurred. More than one-third of this saving was due to the reduced tuberculosis death rate, one-eighth to the decline in pneumonia, and one-ninth to the decline in the four principal diseases of childhood—measles, scarlet fever, whooping cough, and diphtheria. Approximately three-fourths of this saving in lives may be credited to the reduced death rate from preventable diseases during the last 20 years—the diseases which have been the chief points of attack in public-health work.

Tuberculosis.—Another reduction in the death rate for tuberculosis was an outstanding feature of the year—a reduction that has been continuous since 1911, with the exception of the years 1918 and 1926. The rate for 1930 in this group was 80.9 per 100,000, or 7.3 per cent below the previous low rate of 87.3 for 1929, and 64 per cent below that for 1911. It is noted that among the white male persons of this group the maximum tuberculosis mortality rate was at age 54 in 1929 as compared with age 39 in 1911.

Typhoid fever.—The typhoid fever death rate, 2.4 per 100,000, was identical with that for 1929—the lowest rate recorded in the records of the company. This represents a decline of nearly 90 per cent as compared with the rate of 20 years ago, a greater decline than that shown by any other disease.

Measles, scarlet fever, whooping cough, and diphtheria.—The combined mortality from these four diseases of childhood declined 26 per cent in a single year, and each of them registered a new low death rate for this group. In a brief space of three years, the diphtheria rate has been cut in half, in a single year it has been reduced more than one-third, and since 1911 it has dropped four-fifths. As an example of what it is possible to accomplish in the control of a communicable disease, diphtheria ranks next to typhoid fever.

Influenza and pneumonia.—There was no serious outbreak of influenza in 1930, and the death rate for the disease was lower than that for any year, with the exception of 1921, since the pandemic

of 1918–19. The rate for pneumonia, as well as the combined rate, is the lowest ever recorded for this group.

Cancer.—In December an unusually large number of cancer deaths was more than sufficient to wipe out the slight improvement which had been noted for the year up to the close of November. The rise for the year, however, was less than 1 per cent. The death rate for cancer among these insured persons for 1930 shows an increase of 16.3 per cent over the figure for nineteen years ago.

Diabetes.—The mortality rate for diabetes, 18.6 per 100,000, is the same as that for 1929—the highest on record for this group. An upward trend has been noted for diabetes mortality for many years, but the rise during the decade just closed has been more pronounced than ever.

Principal "degenerative" diseases.—The mortality from both heart disease and chronic nephritis (Bright's disease) decreased slightly in 1930. These declines are considered to be due in large measure to the lower incidence of influenza and pneumonia.

Despite the decline in 1930, heart disease still stands far ahead as the leading cause of death, and, with the single exception of 1929, the 1930 death rate for this cause (146.4 per 100,000) was the highest ever recorded for this group. The Bulletin calls attention to the drop in the rate among children and young adults and attributes this favorable development to public health efforts, such as increased school medical inspections, growing interest in industrial hygiene in the prevention of heart disease, and the widespread preventive and therapeutic efforts being made against cardiac affections. The death rate for chronic nephritis has shown little variation for more than a decade. It was 27.5 per cent lower in 1930, however, than in 1911.

Diseases of pregnancy and childbirth.—For the third successive year a new low rate was established for puerperal diseases. The rate for 1930 was 12.3 per 100,000—a reduction of 10.9 per cent from the rate for the preceding year and of 37.9 per cent from that for 1911.

Diarrhea and enteritis.—The death rate for diarrheal complaints increased fractionally in 1930, but the *Bulletin* states that in infants under one year of age the figures for the year up to the end of September show a considerable decline from the previous minimum of 1929.

Deaths from other causes.—Deaths from alcoholism declined from 3.5 per 100,000 in 1929 to 3.2 in 1930, while the rate for cirrhosis of the liver rose from 6.6 to 6.8.

The rate for suicides increased from 8.7 per 100,000 in 1929 to 9.8 in 1930 (12.6 per cent).

The rate for automobile fatalities in this group showed a decline for the first time in 20 years. The decrease was small, however, and may not be representative of what occurred in the general population.

Death rates per 100,000 for principal causes, 1911 and 1920 to 1930, ages 1 and over

[Industrial department, Metropolitan Life Insurance Co.]

Cause of death	[1] 1930	1929	1928	1927	1926	1925	1924	1923	1922	1921	1920	1911
All causes of death	833.2	891.9	869.3	842.2	885.7	846.3	848.0	897.1	882.9	870.6	989.4	1,253.0
Typhoid fever	2.4	2.4	2.7	4.7	4.2	4.6	4.4	5.2	5.7	6.7	6.7	22.8
Communicable diseases of childhood	12.3	16.7	19.0	19.7	25.9	19.7	26.2	33.1	29.8	37.9	43.1	58.9
Measles	2.2	2.4	4.2	3.4	8.0	2.5	5.7	8.4	4.3	3.2	8.5	11.4
Scarlet fever	2.5	2.7	2.6	3.0	3.4	3.4	4.3	4.4	4.9	7.0	6.0	13.1
Whooping cough	1.9	3.0	2.7	3.1	5.0	3.6	3.5	4.8	2.6	3.9	6.6	7.1
Diphtheria	5.7	8.6	9.5	10.2	9.5	10.2	12.7	15.5	18.0	23.8	22.1	27.3
Influenza and pneumonia	75.6	111.7	94.8	78.7	105.6	88.3	84.4	107.7	95.3	76.5	159.5	131.2
Influenza	13.1	37.7	22.0	15.7	27.4	19.4	14.2	30.1	21.7	8.7	53.5	15.9
Pneumonia	62.5	74.0	72.8	63.0	78.2	69.0	70.2	77.6	73.7	67.8	106.1	115.3
Poliomyelitis	1.1	.6	1.2	2.0	.7	1.4	1.0	.7	.9	1.7	1.0	1.6
Tuberculosis, all forms	80.9	87.3	90.6	93.8	99.5	98.2	104.4	110.5	114.2	117.4	137.9	224.6
Tuberculosis of respiratory system	71.0	77.7	80.0	83.0	87.9	87.0	93.4	100.6	103.6	105.6	124.0	203.0
Cancer, all forms	79.1	78.8	77.0	75.6	75.1	71.8	71.5	72.7	72.0	71.7	69.8	68.0
Diabetes mellitus	18.6	18.6	17.9	17.1	17.0	15.5	15.1	16.2	17.2	15.5	14.1	13.3
Alcoholism	3.2	3.5	3.3	3.5	3.7	3.0	2.9	3.0	2.1	.9	.6	4.0
Cerebral hemorrhage, apoplexy	[2] 61.0	58.9	57.6	56.0	56.5	54.4	61.1	61.9	62.9	62.1	61.3	64.2
Diseases of heart [3]	146.4	149.0	144.4	134.7	136.4	128.7	125.2	128.7	126.7	117.4	117.0	141.8
Diarrhea and enteritis	8.0	7.9	8.7	9.1	10.5	12.3	11.3	11.1	10.8	14.2	15.8	28.0
Chronic nephritis (Bright's disease)	68.9	70.6	71.8	70.8	74.9	71.2	66.5	69.6	70.3	68.0	70.8	95.0
Puerperal state, total	12.3	13.8	14.2	15.7	15.6	16.9	17.2	17.9	19.0	19.8	23.0	19.8
Total external causes	78.8	80.6	77.8	79.8	77.2	78.3	76.9	77.8	71.8	72.0	72.0	97.9
Suicides	9.8	8.7	8.5	8.4	7.8	7.0	7.3	7.4	7.5	7.6	6.1	13.3
Homicides	6.8	6.7	6.8	7.4	7.2	7.4	7.2	7.3	6.3	6.7	5.8	7.2
Accidents, total	62.2	65.2	62.5	63.9	62.3	63.9	62.4	63.0	58.1	57.6	60.1	77.4
Accidental burns	4.5	4.9	5.3	5.3	6.1	6.1	6.4	6.3	6.1	6.6	8.1	8.8
Accidental drowning	5.4	6.5	7.1	6.8	6.3	6.5	7.3	6.7	7.3	8.2	6.7	10.2
Accidental traumatism by fall	9.5	9.1	8.0	8.5	7.9	8.1	7.7	8.4	7.3	7.1	7.3	13.2
Accidental traumatism by machines	1.2	1.6	1.2	1.4	1.4	1.3	1.3	1.7	1.6	1.0	1.7	1.8
Railroad accidents	3.0	3.9	3.9	4.1	4.2	4.0	4.0	4.9	4.1	3.9	5.2	9.5
Automobile accidents	21.0	21.3	18.7	18.7	17.0	16.8	15.9	15.4	13.6	12.2	11.1	2.3
All other accidents	17.6	17.8	18.3	19.1	19.4	21.2	19.7	19.5	18.1	18.6	20.0	31.6
Other diseases and conditions	184.6	191.5	188.3	181.0	183.6	183.4	180.9	181.7	185.1	190.5	197.8	283.5

[1] All 1930 death rates subject to slight correction, since they are based on provisional estimates of lives exposed to risk.
[2] Rate for 1930 not comparable with those for other years due to changes in classification procedure.
[3] Excluding pericarditis, acute endocarditis, acute myocarditis, and angina pectoris.

DEATHS DURING WEEK ENDED JANUARY 31, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended January 31, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce.)

	Week ended January 31, 1931	Corresponding week, 1930
Policies in force	75,238,098	75,447,332
Number of death claims	16,641	15,531
Death claims per 1,000 policies in force, annual rate	11.5	10.7

Deaths*[1] *from all causes in certain large cities of the United States during the week ended January 31, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Jan. 31, 1931				Corresponding week, 1930		Death rate[2] for the first 5 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1931	1930
Total (81 cities)	10,340	15.2	800	[4] 63	13.7	829	14.2	13.1
Akron	40	8.1	6	59	9.8	9	8.0	8.6
Albany[4]	32	12.9	1	20	15.1	2	14.1	15.8
Atlanta	101	19.0	9	92	16.7	7	17.0	16.8
White	56		4	63		5		
Colored	45	(6)	5	144	(6)	2	(6)	(6)
Baltimore[4]	344	22.0	17	58	14.4	19	16.8	15.2
White	240		12	52		11		
Colored	104	(6)	5	78	(6)	8	(6)	(6)
Birmingham	81	15.7	8	80	17.3	9	15.3	14.0
White	38		4	49		5		
Colored	43	(6)	4	97	(6)	4	(6)	(6)
Boston	281	18.7	22	63	11.8	30	17.3	15.4
Bridgeport	50	17.7	0	0	12.4	3	14.4	13.4
Buffalo	165	14.8	12	49	13.2	17	14.2	14.2
Cambridge	29	13.2	4	80	14.7	2	13.9	14.4
Camden	51	22.3	5	87	18.4	3	18.5	14.5
Canton	18	8.8	2	46	19.5	6	10.4	12.6
Chicago[5]	971	14.6	75	66	11.6	68	12.0	11.5
Cincinnati	161	18.4	9	54	19.0	16	17.8	17.0
Cleveland	184	10.5	12	35	12.6	23	11.0	12.0
Columbus	70	12.4	7	68	17.0	10	13.9	15.2
Dallas	67	12.8	8		15.5	5	13.2	13.9
White	55		7			5		
Colored	12	(6)	1		(6)	0	(6)	(6)
Dayton	43	10.8	0	0	13.4	3	13.5	10.4
Denver	74	13.2	7	68	14.5	1	16.2	14.5
Des Moines	38	13.7	5	88	9.1	1	13.3	13.2
Detroit	250	7.9	39	62	10.8	52	8.4	9.9
Duluth	19	9.7	1	25	15.4	2	12.7	11.9
El Paso	39	19.4	0		18.2	3	22.8	20.9
Erie	25	11.1	4	75	14.8	4	11.1	12.1
Fall River[6 7]	31	14.0	0	0	14.9	8	12.8	12.8
Flint	27	8.6	3	38	14.5	12	8.4	9.5
Fort Worth	43	13.4	2		15.6	6	13.1	13.0
White	36		2			5		
Colored	7	(6)	0		(6)	1	(6)	(6)
Grand Rapids	26	7.9	1	15	11.7	1	9.3	10.7
Houston	71	11.9	6		16.9	14	12.7	13.5
White	44		4			11		
Colored	27	(6)	2		(6)	3	(6)	(6)
Indianapolis	100	14.1	7	58	19.1	7	14.5	16.8
White	88		6	56		6		
Colored	12	(6)	1	67	(6)	1	(6)	(6)
Jersey City	122	19.9	21	186	12.5	7	14.6	12.4
Kansas City, Kans	35	14.8	4	82	13.7	6	15.2	13.1
White	25		4	98		6		
Colored	10	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo	116	14.8	8	61	15.5	13	14.7	14.0
Knoxville	33	15.8	4	85	18.6	4	15.2	13.9
White	27		3	71		4		
Colored	6	(6)	1	204	(6)	0	(6)	(6)
Long Beach	25	8.6	0	0	13.8	1	11.1	12.2
Los Angeles	335	13.3	23	67	12.2	16	13.6	13.0
Louisville	118	20.0	11	94	18.5	4	18.7	14.8
White	87		9	89		4		
Colored	31	(6)	2	133	(6)	0	(6)	(6)
Lowell[7]	33	17.1	1	25	19.7	5	15.3	14.0
Lynn	38	19.3	2	52	13.2	2	14.3	11.4
Memphis	86	17.3	10	106	15.8	8	18.7	16.3
White	46		7	117		4		
Colored	40	(6)	3	87	(6)	4	(6)	(6)
Miami	34	15.8	2	51	16.9	2	13.4	12.2
White	27		2	71		1		
Colored	7	(6)	0	0	(6)	1	(6)	(6)

See footnotes at end of table.

Deaths [1] *from all causes in certain large cities of the United States during the week ended January 31, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*—Continued

City	Week ended Jan. 31, 1931				Corresponding week, 1930		Death rate [2] for the first 5 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Milwaukee	124	11.0	16	69	11.2	18	10.0	10.5
Minneapolis	102	11.2	8	52	10.6	4	12.4	12.2
Nashville	59	19.8	3	45	23.7	5	17.3	17.6
White	37		3	60		2		
Colored	22	(6)	0	0	(6)	3	(6)	(6)
New Bedford [7]	24	11.1	1	27	8.8	2	13.1	11.6
New Haven	42	13.5	0	0	16.3	2	13.3	14.6
New Orleans	195	21.7	11	60	22.0	24	21.6	20.8
White	133		6	50		8		
Colored	62	(6)	5	81	(6)	16	(6)	(6)
New York	2,215	16.3	173	72	12.1	140	15.0	11.8
Bronx Borough	311	12.2	18	41	9.0	17	10.8	8.3
Brooklyn Borough	801	15.9	78	83	11.1	58	14.2	10.9
Manhattan Borough	788	22.6	59	101	18.1	51	22.4	17.7
Queens Borough	259	11.7	17	46	7.5	12	10.1	7.8
Richmond Borough	56	17.9	1	18	12.8	2	14.9	13.8
Newark, N. J	143	16.7	13	68	14.6	11	14.1	14.0
Oakland	64	11.4	4	51	12.4	2	13.4	13.3
Oklahoma City	41	10.9	3	41	9.7	3	11.5	9.8
Omaha	66	15.9	9	101	21.1	7	15.6	15.2
Paterson	53	19.9	5	86	11.3	4	14.6	12.3
Philadelphia	728	19.3	46	67	13.3	31	16.8	13.2
Pittsburgh	225	17.4	26	90	17.1	25	16.9	14.7
Portland, Oreg	68	11.5	1	12	14.6	2	13.8	14.4
Providence	89	18.2	7	65	17.3	3	15.3	16.0
Richmond	65	18.4	6	87	16.5	10	16.6	16.3
White	40		3	66		5		
Colored	25	(6)	3	130	(6)	5	(6)	(6)
Rochester	92	14.5	4	36	12.4	6	13.4	11.8
St. Louis	280	17.6	16	54	15.5	10	16.8	14.7
St. Paul	64	12.1	3	31	12.1	5	11.2	12.1
Salt Lake City [5]	29	10.6	2	30	10.6	6	13.9	14.9
San Antonio	80	17.4	11		23.2	17	16.3	21.4
San Diego	51	17.0	3	61	14.6	2	16.9	16.5
San Francisco	180	14.4	5	33	13.7	10	15.4	14.3
Schenectady	22	11.9	0	0	11.4	4	9.5	11.1
Seattle	88	12.3	5	47	15.2	7	13.2	11.2
Somerville	21	10.4	0	0	13.5	4	10.4	12.6
South Bend	14	6.8	3	75	9.4	2	7.7	9.6
Spokane	32	14.3	2	52	12.2	0	14.7	13.0
Springfield, Mass	51	17.5	4	61	19.1	4	13.6	14.0
Syracuse	62	15.2	6	71	12.7	4	13.4	13.3
Tacoma	25	12.1	0	0	10.2	2	15.1	11.0
Toledo	73	12.9	5	46	15.0	4	12.5	13.8
Trenton	50	21.1	6	104	19.4	4	19.6	17.5
Utica	29	14.8	2	52	12.8	3	16.8	15.9
Washington, D. C	181	19.1	7	39	17.1	10	18.5	16.3
White	110		3	25		5		
Colored	71	(6)	4	69	(6)	5	(6)	(6)
Waterbury	25	12.9	2	60	12.5	2	10.5	10.4
Wilmington, Del. [7]	37	18.1	5	108	21.0	7	15.4	15.4
Worcester	70	18.5	3	41	13.6	5	15.5	14.0
Yonkers	38	14.3	2	52	8.5	2	11.2	8.3
Youngstown	37	11.2	5	70	13.8	5	11.1	10.9

[1] Deaths of nonresidents are included. Stillbirths are excluded.

[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.

[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.

[4] Data for 76 cities.

[5] Deaths for week ended Friday.

[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31. Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended February 7, 1931, and February 8, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended February 7, 1931, and February 8, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Feb. 7, 1931	Week ended Feb. 8, 1930	Week ended Feb. 7, 1931	Week ended Feb. 8, 1930	Week ended Feb. 7, 1931	Week ended Feb. 8, 1930	Week ended Feb. 7, 1931	Week ended Feb. 8, 1930
New England States:								
Maine	4	5	38	5	10	12	0	1
New Hampshire	2	3	104	1	132	58	0	0
Vermont	1		6			2	0	0
Massachusetts	65	118	197	2	633	323	3	2
Rhode Island	8	8	21			2	0	0
Connecticut	10	24	182	9	257	24	1	2
Middle Atlantic States:								
New York	106	139	[1]226	[1]153	592	534	12	17
New Jersey	62	120	475	16	663	323	8	4
Pennsylvania	120	136			1,544	730	7	3
East North Central States								
Ohio	57	42	43	16	217	570	6	6
Indiana	59	43	149		459	55	5	31
Illinois	153	161	359	46	980	433	10	19
Michigan	45	64	13	7	191	374	8	22
Wisconsin	21	19	143	22	295	1,058	1	3
West North Central States:								
Minnesota	16	15	5	1	39	247	1	2
Iowa	8	4			11	461	6	9
Missouri	18	36	84	33	893	52	8	18
North Dakota	0	3			1	54	0	0
South Dakota	5	1			8	77	1	0
Nebraska	9	14			6	599	2	6
Kansas	23	15	12	7	16	352	3	7
South Atlantic States:								
Delaware		2	56	2	7	3	0	0
Maryland [2]	21	35	1,625	51	322	8	0	2
District of Columbia	12	13	48	1	47	6	0	0
Virginia							1	6
West Virginia	10	12	111	70	33	85	0	2
North Carolina	36	32	462	44	183	5	6	2
South Carolina [3]	25	26	3,147	1,214	118		0	5
Georgia	7	4	806	121	145		4	12
Florida	8	13	278	7	167	39	3	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, 1931, 1 case in South Carolina.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended February 7, 1931, and February 8, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Feb. 7, 1931	Week ended Feb. 8, 1930	Week ended Feb. 7, 1931	Week ended Feb. 8, 1930	Week ended Feb. 7, 1931	Week ended Feb. 8, 1930	Week ended Feb. 7, 1931	Week ended Feb. 8, 1930
East South Central States:								
Kentucky					97	96	3	0
Tennessee	3	10	185	201	212	147	5	1
Alabama	31	27	233	209	519	63	4	5
Mississippi	17	23					1	7
West South Central States:								
Arkansas	9	3	159	212	6	6	2	3
Louisiana	37	25	220	71	3	73	2	6
Oklahoma [4]	47	28	236	183	42	306	0	8
Texas	76	77	151	267	100	105	1	7
Mountain States:								
Montana		1			5	18	0	1
Idaho		1	3		1	99	0	5
Wyoming				4	2	37	1	1
Colorado	12	10		1	112	101	2	2
New Mexico	6	5	1		51	116	0	5
Arizona	8	8	12	17	263	6	4	4
Utah [2]	2	1	10		2	88	1	5
Pacific States:								
Washington	12	15			67	312	1	9
Oregon	5	7	32	84	98	29	2	2
California	49	62	236	63	676	943	10	12

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Feb. 7, 1931	Week ended Feb. 8, 1930	Week ended Feb. 7, 1931	Week ended Feb. 8, 1930	Week ended Feb. 7, 1931	Week ended Feb. 8, 1930	Week ended Feb. 7, 1931	Week ended Feb. 8, 1930
New England States:								
Maine	0	1	33	71	0	0	2	5
New Hampshire	0	0	1	18	0	0	0	0
Vermont	0	0	1	6	0	3	0	1
Massachusetts	1	1	357	310	0	0	4	5
Rhode Island	0	0	39	38	0	0	0	0
Connecticut	0	0	53	135	0	0	0	0
Middle Atlantic States:								
New York	0	4	789	529	8	6	8	15
New Jersey	0	1	256	241	0	0	5	5
Pennsylvania	1	0	567	475	1	8	13	13
East North Central States:								
Ohio	1	3	499	278	63	242	13	16
Indiana	0	0	345	294	105	247	0	7
Illinois	4	2	472	661	68	128	2	6
Michigan	0	0	331	317	48	100	4	5
Wisconsin	0	1	182	144	3	42	5	5
West North Central States:								
Minnesota	2	0	110	161	9	8	3	3
Iowa	1	1	147	103	64	107	0	1
Missouri	0	0	223	150	34	75	5	1
North Dakota	0	0	42	38	21	40	2	0
South Dakota	1	1	28	30	25	49	1	2
Nebraska	1	0	50	101	69	40	3	0
Kansas	0	0	61	177	118	97	5	1
South Atlantic States:								
Delaware	0	0	23	16	0	0	0	0
Maryland [2]	0	0	105	94	0	0	6	4
District of Columbia	0	0	37	12	0	0	0	4
Virginia	1							
West Virginia	0	0	48	48	21	20	2	5
North Carolina	1	0	86	72	5	17	2	1
South Carolina [3]	0	0	13	24	2	1	7	1
Georgia	0	0	55	24	0	0	6	1
Florida	0	0	8	19	0	1	2	3
East South Central States:								
Kentucky	0	0	97	65	8	17	2	6
Tennessee	0	0	48	49	3	15	5	2
Alabama	0	0	36	34	5	2	5	2
Mississippi	1	0	39	22	21	6	7	5

[2] Week ended Friday.
[3] Typhus fever, 1931, 1 case in South Carolina.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

***Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended February 7, 1931, and February 8, 1930*—Continued**

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Feb. 7, 1931	Week ended Feb. 8, 1930	Week ended Feb. 7, 1931	Week ended Feb. 8, 1930	Week ended Feb. 7, 1931	Week ended Feb. 8, 1930	Week ended Feb. 7, 1931	Week ended Feb. 8, 1930
West South Central States:								
Arkansas	1	0	17	20	38	12	1	5
Louisiana	2	0	24	22	10	3	15	6
Oklahoma [4]	1	0	30	54	113	103	2	3
Texas	0	2	92	94	290	227	22	1
Mountain States:								
Montana	0	0	54	60	7	13	1	0
Idaho	0	0	3	5	1	12	1	1
Wyoming	0	0	7	5	1	1	1	0
Colorado	0	0	49	24	15	57	0	1
New Mexico	0	0	7	9	2	1	0	3
Arizona	0	0	7	8	1	19	1	0
Utah [3]	0	0	6	9	0	0	0	0
Pacific States:								
Washington	1	0	84	86	46	92	0	7
Oregon	2	1	31	67	32	17	0	5
California	6	0	110	340	69	109	5	6

[3] Week ended Friday.

[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
December, 1930										
Kansas	4	112	4	-------	26	-------	4	222	226	13
Mississippi	7	134	3, 052	1, 270	142	283	2	133	30	46
January, 1931										
Arizona	23	34	54	-------	379	-------	1	28	15	4
Connecticut	5	55	384	1	1, 044	-------	0	265	0	2
Georgia	37	71	1, 029	85	382	28	1	246	15	19
Nebraska	6	39	84	-------	84	-------	9	230	288	6
North Dakota	10	23	13	-------	21	-------	5	145	44	4
Wyoming	5	2	2	-------	4	-------	2	106	3	0

December, 1930

	Cases
Chicken pox:	
Kansas	717
Mississippi	579
Conjunctivitis:	
Kansas	2
Dysentery:	
Mississippi (amebic)	17
Mississippi (bacillary)	166
German measles:	
Kansas	6
Hookworm disease:	
Mississippi	151
Impetigo contagiosa:	
Kansas	1
Mumps:	
Kansas	78
Mississippi	161
Ophthalmia neonatorum:	
Kansas	1
Mississippi	10
Paratyphoid fever:	
Kansas	2
Puerperal septicemia:	
Mississippi	22
Rabies in animals:	
Mississippi	4
Scabies:	
Kansas	10
Tetanus:	
Kansas	2
Trachoma:	
Mississippi	14
Tularaemia:	
Kansas	5
Undulant fever:	
Kansas	6

	Cases
Vincent's angina:	
Kansas	7
Whooping cough:	
Kansas	118
Mississippi	624

January, 1931

	Cases
Anthrax:	
Connecticut	1
Chicken pox:	
Arizona	57
Connecticut	577
Georgia	180
Nebraska	340
North Dakota	169
Wyoming	183
Conjunctivitis:	
Connecticut	28
Dysentery:	
Arizona	1
Georgia	8
German measles:	
Connecticut	25
Hookworm disease:	
Georgia	20
Lethargic encephalitis	
Connecticut	3
Mumps:	
Arizona	26
Connecticut	380
Georgia	116
Nebraska	278
North Dakota	60
Mumps—Continued.	
Wyoming	89
Rabies in animals:	
Connecticut	6
Rabies in man:	
Georgia	1
Septic sore throat:	
Connecticut	11
Georgia	51
North Dakota	1
Tetanus.	
North Dakota	1
Trachoma:	
Arizona	8
North Dakota	4
Trichinosis:	
Connecticut	1
Typhus fever:	
Georgia	15
Undulant fever:	
Arizona	1
Connecticut	2
Vincent's angina:	
North Dakota	47
Wyoming	2
Whooping cough:	
Arizona	15
Connecticut	279
Georgia	112
Nebraska	129
North Dakota	73
Wyoming	68

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33 315,-000. The estimated population of the 89 cities reporting deaths is more than 31,775,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended January 31, 1931, and February 1, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,404	1,619	
96 cities	567	705	962
Measles:			
45 States	8,853	8,101	
96 cities	2,681	1,751	
Meningococcus meningitis:			
47 States	155	232	
96 cities	75	95	
Poliomyelitis:			
46 States	36	20	
Scarlet fever:			
46 States	5,884	5,422	
96 cities	2,155	1,828	1,528
Smallpox:			
46 States	1,031	1,628	
96 cities	111	196	56
Typhoid fever:			
46 States	166	129	
96 cities	31	31	38
Deaths reported			
Influenza and pneumonia:			
89 cities	2,006	1,083	
Smallpox:			
89 cities	0	0	

City reports for week ended January 31, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	11	1	0	13	1	2	7	3
New Hampshire:								
Concord	0	0	0	....	0	1	0	0
Manchester	0	1	0	....	1	17	0	0
Nashua	0	0	1	....	0	0	0	0
Vermont:								
Barre	0	0	0	....	1	0	0	1
Burlington	0	1	0	....	0	0	0	0
Massachusetts:								
Boston	66	36	23	149	5	68	15	17
Fall River	2	5	4	2	0	2	5	1
Springfield	16	5	2	1	1	1	7	1
Worcester	2	4	5	19	2	7	0	17
Rhode Island:								
Pawtucket	8	2	0	....	0	0	0	2
Providence	4	10	4	17	1	1	0	5
Connecticut:								
Bridgeport	0	6	1	26	1	2	1	9
Hartford	7	6	4	14	0	52	1	11
New Haven	12	0	1	11	2	46	17	10
MIDDLE ATLANTIC								
New York:								
Buffalo	39	13	9	5	1	47	78	30
New York	264	206	89	646	142	206	33	535
Rochester	5	8	2	3	1	0	1	4
Syracuse	57	3	1	....	1	[illegible]	0	5
New Jersey:								
Camden	6	7	5	14	7	88	8	11
Newark	72	21	11	163	4	5	6	33
Trenton	8	2	3	129	1	2	1	4
Pennsylvania:								
Philadelphia	177	69	18	198	61	127	20	141
Pittsburgh	91	22	11	18	9	62	22	58
Reading	8	2	2	....	0	138	36	3
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	9	9	4	7	1	57	30	18
Cleveland	147	33	19	40	4	5	183	12
Columbus	15	3	4	5	6	3	8	6
Toledo	40	6	3	....	0	1	28	7
Indiana:								
Fort Wayne	3	5	5	....	0	40	0	1
Indianapolis	46	9	4	....	3	23	2	12
South Bend	....	1	....	....	....	....	....	....
Terre Haute	0	1	0	....	0	0	0	1
Illinois:								
Chicago	60	107	98	411	38	32	66	173
Springfield	15	1	4	3	1	38	0	8
Michigan:								
Detroit	108	72	26	37	2	6	23	33
Flint	27	2	3	7	0	4	0	2
Grand Rapids	3	1	0	....	0	1	0	1

City reports for week ended January 31, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	16	0	0	-----	0	0	15	0
Madison	68	1	5	-----	-----	4	32	-----
Milwaukee	132	18	4	8	4	24	264	20
Racine	10	2	0	8	0	1	1	0
Superior	7	1	0	-----	0	0	0	1
WEST NORTH CENTRAL								
Minnesota:								
Duluth	15	0	0	-----	1	0	4	1
Minneapolis	38	22	3	-----	2	35	96	8
St. Paul	39	5	0	1	1	5	0	9
Iowa:								
Des Moines	3	2	1	-----	-----	0	1	-----
Sioux City	11	1	3	-----	-----	0	8	-----
Waterloo	6	1	0	-----	-----	0	0	-----
Missouri:								
Kansas City	48	5	12	1	0	41	0	14
St. Joseph	6	1	9	-----	2	0	0	3
St. Louis	29	43	26	33	1	712	21	-----
North Dakota:								
Fargo	9	0	0	-----	0	0	5	1
Grand Forks	3	0	0	-----	-----	0	4	-----
South Dakota:								
Aberdeen	0	0	0	-----	-----	0	1	-----
Sioux Falls	0	0	0	-----	-----	0	0	-----
Nebraska:								
Omaha	21	5	4	-----	0	1	10	9
Kansas:								
Topeka	0	2	0	1	3	1	0	2
Wichita	4	4	0	-----	0	0	0	7
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	3	1	-----	2	3	0	7
Maryland:								
Baltimore	180	24	14	2,053	19	232	44	66
Cumberland	0	0	0	11	0	1	0	2
Frederick	0	0	0	-----	0	0	5	0
District of Columbia:								
Washington	50	20	11	52	12	27	0	32
Virginia:								
Lynchburg	8	1	0	-----	1	2	0	1
Norfolk	13	2	1	289	2	1	0	11
Richmond	0	5	7	33	6	134	0	11
Roanoke	10	2	0	-----	4	0	0	0
West Virginia:								
Charleston	3	1	0	2	1	0	2	1
Wheeling	15	1	0	1	0	0	0	3
North Carolina:								
Raleigh	3	1	0	-----	0	2	0	3
Wilmington	19	0	0	-----	2	0	0	0
Winston-Salem	5	0	0	137	3	5	1	15
South Carolina:								
Charleston	3	2	0	230	3	22	6	8
Columbia	-----	1	-----	-----	-----	-----	-----	-----
Greenville	0	0	1	-----	0	1	0	0
Georgia:								
Atlanta	0	5	2	115	5	39	0	15
Brunswick	0	0	0	-----	0	0	0	0
Savannah	2	1	1	108	4	0	3	4
Florida:								
Miami	0	2	0	1	0	0	0	1
Tampa	11	2	0	4	1	45	1	3
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	1	-----	0	0	1	2
Tennessee:								
Memphis	73	5	4	-----	5	9	11	9
Nashville	0	1	0	-----	4	13	0	8

City reports for week ended January 31, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL—continued								
Alabama:								
Birmingham	2	4	4	8	3	133	4	13
Mobile	1	0	2	74	0	1	0	4
Montgomery	30	1	1	7		0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Forth Smith	0	0	1			1	0	
Little Rock	1	1	0		0	1	4	0
Louisiana:								
New Orleans	1	15	34	16	17	0	0	15
Shreveport	8	1	1		1	0	2	9
Oklahoma:								
Muskogee	1	1	0	6	0	0	0	1
Oklahoma City	2	2	3	20	1	5	0	12
Tulsa	10	2	1			1	1	
Texas:								
Dallas	25	7	5	5	6	2	5	8
Fort Worth	9	4	2		0	0	0	6
Galveston	0	1	0		0	0	0	6
Houston	11	8	10		0	0	2	6
San Antonio	3	4	3		5	1	0	15
MOUNTAIN								
Montana:								
Billings	4	0	0		0	0	0	1
Great Falls	4	1	0		1	0	0	0
Helena	0	0	0		0	0	0	0
Missoula	0	0	0		0	0	0	0
Idaho:								
Boise	0	0	0		0	0	0	0
Colorado:								
Denver	46	9	8		2	17	0	14
Pueblo	2	2	0		1	39	4	1
New Mexico:								
Albuquerque	0	0	0	1	0	0	0	3
Arizona:								
Phoenix	0	1	0		0	0	2	2
Utah:								
Salt Lake City	11	3	0		2	1	3	6
Nevada:								
Reno	0	0	0		0	0	0	1
PACIFIC								
Washington:								
Seattle	21	4	2			2	33	
Spokane	15	3	0			13	0	
Tacoma	12	3	1		0	1	0	2
Oregon:								
Portland	24	9	0	2	1	6	10	0
Salem	0	1	0		0	11	18	0
California:								
Los Angeles	88	43	12	100	2	36	9	30
Sacramento	16	2	2	1	1	1	3	10
San Francisco	55	15	6	14	3	3	4	6

City reports for week ended January 31, 1931—**Continued**

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	4	15	0	0	0	0	0	0	0	27	18
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	8
Manchester	2	3	0	0	0	0	0	0	0	0	27
Nashua	2	0	0	0	0	0	0	0	0	0	--------
Barre	0	2	0	0	0	2	0	0	0	4	9
Burlington	2	0	0	0	0	0	0	0	0	0	7
Massachusetts:											
Boston	84	104	0	0	0	12	0	2	0	46	281
Fall River	4	15	0	0	0	3	0	0	0	8	31
Springfield	10	7	0	0	0	1	0	0	0	0	51
Worcester	11	21	0	0	0	1	0	0	0	12	70
Rhode Island:											
Pawtucket	2	23	0	0	0	1	1	0	0	0	16
Providence	13	18	0	0	0	5	0	0	0	2	89
Connecticut:											
Bridgeport	10	5	0	0	0	5	0	0	0	1	50
Hartford	7	4	0	0	0	1	0	0	0	4	50
New Haven	8	2	0	0	0	1	0	0	0	3	42
MIDDLE ATLANTIC											
New York:											
Buffalo	26	34	1	0	0	3	0	0	0	5	161
New York	258	283	1	0	0	110	8	3	0	140	2,215
Rochester	9	109	0	0	0	0	0	0	0	21	84
Syracuse	15	9	0	0	0	2	1	0	1	20	62
New Jersey:											
Camden	8	6	0	0	0	0	0	0	0	1	51
Newark	43	33	0	0	0	10	0	0	0	36	146
Trenton	6	15	0	0	0	4	0	0	0	0	50
Pennsylvania:											
Philadelphia	107	184	0	0	0	46	2	1	1	17	728
Pittsburgh	37	58	0	0	0	7	1	0	0	40	225
Reading	4	3	0	0	0	2	0	0	0	0	30
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	22	37	0	1	0	10	1	0	0	7	161
Cleveland	47	77	0	0	0	13	1	0	0	17	184
Columbus	12	12	0	0	0	7	1	0	1	0	70
Toledo	15	14	0	4	0	7	0	1	0	4	73
Indiana:											
Fort Wayne	6	7	0	4	0	1	0	0	0	1	24
Indianapolis	12	78	4	24	0	3	0	0	0	41	--------
South Bend	4	--------	1	--------	--------	--------	0	--------	--------	--------	--------
Terre Haute	4	8	1	0	0	0	0	0	0	2	13
Illinois:											
Chicago	138	259	2	5	0	41	5	0	0	68	971
Springfield	3	4	0	0	0	0	1	0	0	1	31
Michigan:											
Detroit	117	86	2	2	0	14	1	1	0	71	250
Flint	15	11	1	1	0	0	0	0	0	6	27
Grand Rapids	13	8	0	2	0	1	0	0	0	8	26
Wisconsin:											
Kenosha	2	8	0	1	0	0	0	0	0	0	10
Madison	4	2	0	0	--------	--------	0	0	--------	6	--------
Milwaukee	39	19	1	0	0	6	0	1	0	25	124
Racine	5	5	0	0	0	1	0	0	0	3	11
Superior	3	3	0	0	0	0	0	0	0	2	8

City reports for week ended January 31, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL											
Minnesota:											
Duluth	11	1	0	0	0	0	0	0	0	5	19
Minneapolis	54	15	3	2	0	3	1	4	0	8	102
St. Paul	35	5	1	0	0	2	1	1	0	13	64
Iowa:											
Des Moines	11	7	2	3			0	0		2	38
Sioux City	1	20	1	1			0	0		0	
Waterloo	3	0	0	0			0	0		2	
Missouri:											
Kansas City	19	12	1	0	0	6	0	0	0	0	116
St. Joseph	3	8	0	0	0	0	0	0	0	0	35
St. Louis	38	126	1	2	0	15	0	2	0	17	280
North Dakota:											
Fargo	3	6	0	0	0	0	0	0	0	3	7
Grand Forks	0	0	1	0			0	0		0	
South Dakota:											
Aberdeen	1	1	0	1			0	0		0	
Sioux Falls	2	0	0	5			0	0		0	9
Nebraska:											
Omaha	5	8	1	20	0	1	0	0	0	5	66
Kansas:											
Topeka	3	1	1	0	0	0	0	0	0	0	17
Wichita	6	0	0	19	0	2	0	0	0	2	40
SOUTH ATLANTIC											
Delaware:											
Wilmington	6	9	0	0	0	1	0	0	0	1	37
Maryland:											
Baltimore	39	53	0	0	0	21	2	0	0	16	344
Cumberland	1	3	0	0	0	1	0	0	0	0	14
Frederick	1	1	0	0	0	0	0	0	0	0	4
District of Col.:											
Washington	26	26	0	0	0	7	1	1	0	7	181
Virginia:											
Lynchburg	0	1	0	0	0	0	0	0	0	0	11
Norfolk	3	2	0	0	0	2	0	0	0	5	
Richmond	5	13	0	0	0	5	0	0	0	3	73
Roanoke	1	1	0	0	0	1	0	0	0	0	23
West Virginia:											
Charleston	0	0	0	0	0	0	0	1	0	0	10
Wheeling	2	0	0	0	0	0	1	0	0	0	17
North Carolina:											
Raleigh	0	0	0	0	0	1	0	0	0	5	13
Wilmington	1	1	0	0	0	0	0	0	0	2	13
Winston-Salem	2	0	1	0	0	4	0	0	0	0	36
South Carolina:											
Charleston	1	0	0	0	0	2	0	0	0	0	33
Columbia	0		1				0				
Greenville	1	1	0	0	0	0	0	0	0	0	
Georgia:											
Atlanta	6	44	2	0	0	12	0	2	1	2	101
Brunswick	0	0	0	0	0	1	0	0	0	0	5
Savannah	1	0	0	0	0	3	0	0	0	0	31
Florida:											
Miami	1	0	0	0	0	0	0	0	0	5	34
Tampa	1	3	0	0	0	2	1	0	0	0	24
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	11	0	0	0	2	0	1	0	0	37
Tennessee:											
Memphis	7	50	1	2	0	10	0	1	1	1	86
Nashville	2	7	0	0	0	4	0	1	0	0	59
Alabama:											
Birmingham	4	15	1	0	0	2	1	0	0	3	81
Mobile	1	2	0	1	0	2	0	0	0	0	28
Montgomery	0	3	0	0			0	0		0	

City reports for week ended January 31, 1931—**Continued**

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	1	0	0	--------	--------	0	0	--------	1	--------
Little Rock	1	1	0	0	0	1	0	0	0	0	--------
Louisiana:											
New Orleans	8	19	0	3	0	17	3	1	0	1	195
Shreveport	1	1	0	0	0	0	0	0	0	0	32
Oklahoma:											
Muskogee	1	0	2	0	0	0	0	0	0	1	--------
Oklahoma City	3	4	1	3	0	4	0	1	0	0	41
Tulsa	2	5	2	5	--------	--------	0	0	--------	0	1
Texas:											
Dallas	6	8	2	0	0	4	0	0	0	2	67
Fort Worth	3	4	1	2	0	4	0	1	0	0	43
Galveston	0	0	0	1	0	0	1	2	0	0	23
Houston	4	2	2	11	0	5	0	1	0	0	71
San Antonio	1	1	0	0	0	8	0	0	0	0	80
MOUNTAIN											
Montana:											
Billings	1	0	0	0	0	0	0	0	0	6	8
Great Falls	3	5	0	0	0	0	0	0	0	8	7
Helena	1	0	0	0	0	0	0	0	0	0	5
Missoula	1	0	0	0	0	1	0	0	0	0	3
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	0	3
Colorado:											
Denver	14	28	1	0	0	6	0	0	0	17	80
Pueblo	2	0	0	0	0	1	0	0	0	4	7
New Mexico:											
Albuquerque	1	0	0	0	0	2	0	0	0	1	7
Arizona:											
Phoenix	0	1	0	0	0	1	0	0	0	3	--------
Utah:											
Salt Lake City	5	4	1	0	0	2	0	0	0	27	29
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	4
PACIFIC											
Washington:											
Seattle	11	12	3	1	--------	--------	1	1	--------	27	--------
Spokane	7	4	7	3	--------	--------	0	0	--------	0	--------
Tacoma	3	5	4	1	0	0	0	0	0	1	25
Oregon:											
Portland	6	4	12	18	0	1	0	0	0	0	68
Salem	0	0	1	0	0	0	0	0	0	0	--------
California:											
Los Angeles	43	45	4	2	0	23	2	0	0	21	335
Sacramento	2	0	1	1	0	3	0	[1] 3	0	13	37
San Francisco	23	7	2	1	0	11	0	1	0	30	169

[1] Non residents

City reports for week ended January 31, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
NEW ENGLAND									
Massachusetts:									
Boston	1	0	0	0	0	0	1	1	0
Worcester	0	0	0	0	0	0	0	1	0
Connecticut:									
Bridgeport	0	0	1	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
New York [1]	23	17	2	3	0	0	1	0	0
Rochester	1	0	0	0	0	0	0	0	0
New Jersey:									
Newark	2	1	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	8	1	1	0	0	0	0	1	0
Pittsburgh	1	1	1	1	0	0	0	1	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	2	1	0	0	0	0	0	0	0
Cleveland	2	0	1	0	0	0	0	0	0
Indiana:									
Indianapolis	2	1	0	0	0	0	0	1	0
Illinois:									
Chicago	6	4	0	0	0	0	0	1	0
Michigan:									
Detroit	6	3	1	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
St. Paul	0	0	0	0	0	0	0	0	1
Iowa:									
Waterloo	1	1	0	0	0	0	0	0	0
Missouri:									
Kansas City	3	1	0	0	0	0	0	1	0
St. Louis	1	0	0	0	0	0	0	0	0
SOUTH ATLANTIC [1]									
Maryland:									
Baltimore	0	0	0	1	0	0	0	0	0
District of Columbia:									
Washington	3	1	0	0	0	0	0	0	0
North Carolina:									
Wilmington	0	0	0	0	0	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	4	0	0	0	0
Georgia: [1]									
Atlanta	0	1	0	0	0	0	0	0	0
Brunswick	0	0	0	0	0	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	3	1	0	0	0	1	0	0	0
Alabama:									
Birmingham	1	1	0	0	0	0	0	0	0
Mobile [1]	0	0	0	0	0	1	0	0	0
Montgomery	0	0	0	0	1	0	0	0	0

[1] Typhus fever: 4 cases; 1 case at New York City, N. Y.; 1 case at Savannah, Ga.; 1 case at Miami, Fla.; and 1 case at Mobile, Ala.

City reports for week ended January 31, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
WEST SOUTH CENTRAL									
Arkansas:									
Fort Smith	1	1	0	0	0	0	0	0	0
Louisiana.									
New Orleans	6	4	0	0	1	1	0	0	0
Texas:									
Galveston	1	0	0	0	0	0	0	0	0
MOUNTAIN									
New Mexico:									
Albuquerque	0	1	0	0	0	0	0	0	0
Arizona:									
Phoenix	0	1	0	0	0	0	0	0	0
Utah.									
Salt Lake	1	0	0	0	0	0	0	0	0
PACIFIC									
California:									
San Francisco	0	0	1	0	0	0	0	3	0

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended January 31, 1931, compared with those for a like period ended February 1, 1930. The population figures used in computing the rates are estimated midyear populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities December 28, 1930, to January 31, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929–30 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Jan. 3, 1931	Jan. 4, 1930	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930	Jan. 31, 1931	Feb. 1, 1930
98 cities	78	113	81	115	74	108	[2] 79	110	[3] 89	112
New England	115	141	79	169	91	133	106	160	106	135
Middle Atlantic	67	81	63	107	56	89	67	91	68	98
East North Central	89	153	97	130	95	126	[4] 94	141	[5] 111	139
West North Central	82	116	98	126	82	110	84	83	111	77
South Atlantic	61	94	83	90	69	112	[6] 65	116	[6] 73	116
East South Central	70	102	116	72	70	60	76	66	70	84
West South Central	132	181	142	153	108	192	81	146	183	216
Mountain	61	53	35	70	52	53	35	35	70	35
Pacific	53	99	61	73	47	81	88	79	45	69

MEASLES CASE RATES

	Jan. 3, 1931	Jan. 4, 1930	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930	Jan. 31, 1931	Feb. 1, 1930
98 cities	276	126	350	172	324	203	[2] 404	220	[3] 420	278
New England	267	129	490	121	310	172	522	230	438	341
Middle Atlantic	99	72	178	110	158	117	251	111	306	145
East North Central	54	117	63	152	87	150	[4] 74	135	[5] 144	167
West North Central	1,871	283	2,156	310	1,829	372	1,984	467	1,521	424
South Atlantic	518	144	429	128	500	182	[6] 804	172	[6] 1,032	314
East South Central	896	6	861	12	995	36	698	24	908	54
West South Central	24	91	20	293	7	373	10	582	17	293
Mountain	313	203	226	150	374	247	757	220	496	396
Pacific	24	261	33	443	55	579	72	626	110	1,028

SCARLET FEVER CASE RATES

	Jan. 3, 1931	Jan. 4, 1930	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930	Jan. 31, 1931	Feb. 1, 1930
98 cities	227	242	277	266	310	272	[2] 333	288	[3] 337	292
New England	325	391	433	431	539	397	575	457	519	346
Middle Atlantic	226	175	242	220	282	212	314	226	328	239
East North Central	255	341	363	350	398	394	[4] 383	375	[5] 380	416
West North Central	235	254	296	221	321	265	323	314	386	283
South Atlantic	259	202	276	218	304	216	[6] 343	192	[6] 312	224
East South Central	291	114	396	96	465	90	483	149	512	143
West South Central	105	80	68	129	129	125	142	98	112	73
Mountain	218	388	322	493	331	344	357	379	322	414
Pacific	71	225	72	241	72	237	119	344	143	306

SMALLPOX CASE RATES

	Jan. 3, 1931	Jan. 4, 1930	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930	Jan. 31, 1931	Feb. 1, 1930
98 cities	7	19	13	30	16	32	[2] 16	26	[3] 17	31
New England	0	0	0	0	0	0	0	5	0	0
Middle Atlantic	0	0	0	0	0	0	0	1	0	0
East North Central	6	16	15	27	10	36	[4] 21	19	[5] 25	39
West North Central	46	81	43	91	68	124	77	72	84	48
South Atlantic	0	2	2	0	0	6	[6] 4	2	[6] 0	6
East South Central	0	0	6	6	17	0	29	0	17	12
West South Central	17	14	37	66	27	38	34	35	51	73
Mountain	9	53	9	44	78	53	9	26	0	62
Pacific	10	89	18	140	29	123	20	152	18	152

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1931 and 1930, respectively.
[2] Springfield, Ill., and Columbia, S. C., not included.
[3] South Bend, Ind., and Columbia, S. C., not included.
[4] Springfield, Ill., not included.
[5] South Bend, Ind., not included.
[6] Columbia, S. C., not included.

Summary of weekly reports from cities December 28, 1930, to January 31, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929–30—(Continued)

TYPHOID FEVER CASE RATES

	Week ended—									
	Jan. 3, 1931	Jan. 4, 1930	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930	Jan. 31, 1931	Feb. 1, 1930
98 cities	5	3	4	3	5	5	[2] 6	4	[3] 5	5
New England	2	2	5	0	0	5	2	0	5	0
Middle Atlantic	4	1	2	3	2	3	3	5	2	5
East North Central	4	2	2	2	2	2	[4] 3	2	[5] 1	3
West North Central	2	0	0	2	4	12	10	2	13	4
South Atlantic	4	6	10	10	10	6	[6] 14	8	[6] 8	8
East South Central	47	6	12	6	52	12	12	18	17	6
West South Central	3	0	20	3	14	7	27	3	14	3
Mountain	17	9	17	0	9	62	17	9	0	9
Pacific	6	8	2	4	2	4	6	2	10	14

INFLUENZA DEATH RATES

91 cities	16	16	24	18	30	19	[2] 52	21	[3] 70	16
New England	7	7	5	0	10	10	12	10	34	2
Middle Atlantic	17	9	29	13	59	14	91	14	101	14
East North Central	7	15	12	12	9	17	[4] 18	17	[5] 36	13
West North Central	3	27	21	30	18	17	29	18	29	18
South Atlantic	20	20	28	34	41	24	[6] 38	34	[6] 127	12
East South Central	25	26	44	58	63	39	63	52	76	52
West South Central	90	71	76	57	79	60	83	103	100	82
Mountain	17	18	44	44	35	26	44	9	52	9
Pacific	10	10	22	12	10	12	22	15	14	2

PNEUMONIA DEATH RATES

91 cities	160	165	185	161	219	151	[2] 229	140	[3] 258	164
New England	159	169	113	184	159	126	178	138	185	193
Middle Atlantic	182	170	233	183	311	159	332	128	368	158
East North Central	101	114	110	121	124	108	[4] 125	110	[5] 177	128
West North Central	177	197	200	153	212	209	171	150	159	162
South Atlantic	227	240	243	192	237	186	[6] 280	214	[6] 345	238
East South Central	202	227	265	123	227	142	296	194	227	239
West South Central	186	295	238	189	228	221	245	288	203	292
Maountain	261	185	244	229	270	256	157	220	200	229
Pacific	130	92	134	120	118	137	103	77	115	92

[2] Springfield, Ill., and Columbia, S. C., not included.
[3] South Bend, Ind., and Columbia, S. C., not included.
[4] Springfield, Ill., not included.
[5] South Bend, Ind., not included.
[6] Columbia, S. C., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended January 31, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended January 31, 1931, as follows:

Province	Cerebro-spinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia		106		1	
New Brunswick [1]					
Quebec	1				11
Ontario	1	7	1	30	5
Manitoba				1	2
Saskatchewan				5	
Alberta	1				
British Columbia	3	4			
Total	6	117	1	37	18

[1] No case of any disease included in the table was reported during the week

Quebec Province—Communicable diseases—Week ended January 31, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended January 31, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Mumps	27
Chicken pox	97	Puerperal septicemia	1
Diphtheria	33	Scarlet fever	76
Erysipelas	8	Tuberculosis	52
German measles	2	Typhoid fever	11
Measles	25	Whooping cough	28

YUGOSLAVIA

Communicable diseases—December, 1930.—During the month of December, 1930, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	40	5	Measles	1,186	14
Cerebrospinal meningitis	10	6	Puerperal septicemia	8	4
Diphtheria and croup	1,460	225	Scarlet fever	1,099	164
Dysentery	52	1	Rabies	4	4
Erysipelas	179	8	Tetanus	17	9
Glanders	1		Typhoid fever	356	58
Leprosy	1		Typhus fever	1	1
Lethargic encephalitis	1				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Week ended— November, 1930: 22	November, 1930: 29	December, 1930: 6	December, 1930: 13	December, 1930: 20	December, 1930: 27	January, 1931: 3	January, 1931: 10	January, 1931: 17	January, 1931: 24	January, 1931: 31	Feb. 7, 1931
Afghanistan	C	P															
China:																	
Amoy	C		2														
	D		2														
Canton	C			1	1												
Shanghai	C		34	38	2												
	D		3	4													
Shensi Province	C		P														
Swatow	C	3	2														
Tientsin	C	2	1														
India	C	42, 893	51, 551	36, 529	18, 944	3, 166	2, 689	2, 634									
	D	22, 358	23, 959	17, 635	9, 782	1, 616	1, 404	1, 553									
Bassein	C		1														
Bombay	C	14	1	16	19	2	2	4	5					20			
	D	8	2	11	17	2	1	1	3					6			
Calcutta	C	63	27	24	33	4	6	2	10	9	7	6	6	36			
	D	30	12	15	16	4	4	1	7	6	4	5	5	25			
Madras	C	1		2	1					14	44	70	73				
	D	1		2						8	12	19	28	21			
Rangoon	C	1	2	1							1			1			
	D	1	1	1							1			1			
Tuticorin	C			1	1	4		1		1							
	D			1	1												
India (French):																	
Chandernagor	C		1	3	1		1										
	D			1						1							
Pondicherry	C			1	1	1	1	1	1	3	9	2		9	4		
	D			1		1	1	1	1	3	3	1		3	3		
India (Portuguese)	C	1	1		14					1							
	D		1		9												

Indo-China (see also table below):																	
Pnompenh	C	11		2	1		1	1							1		
	D	6					1	1									
Saigon and Cholon	C	5		2	1		1		2	1		4	4	4	1		
	D	1					1					2	2	2	1		
Philippine Islands:[1]																	
Ports—																	
Cebu	C	9	2														
	D	8	2														
Iloilo	C	64	10	1			1					1				2	
	D	56	14	4			3					1				2	
Manila	C	1	43	5													
	D		12	1													
Provinces—																	
Antique	C	20	47	40													
	D	12	31	18													
Bohol	C	138	49														
	D	79	20														
Bulacan	C	1	4	2													
	D		2	1													
Capiz	C	2	1													3	56
	D	2														2	45
Cebu	C	85	25														
	D	50	11														
Iloilo	C	571	238	50	30	11	21	13		7	5	13	3	11	41	36	57
	D	376	151	40	23	8	11	8		6	4	10	2	9	27	25	49
Masbate	C	34															
	D	14															
Negros, Occidental	C	343	122	28	56	44	38	48	33	28	19	33	40	19	32	33	6
	D	237	91	20	41	33	17	45	23	22	16	26	33	15	17	19	5
Negros, Oriental	C	8															1
	D	4															1
Pampanga	C		1														
Pangasinan	C	1															
	D	1															
Samar	C	18	4	7	16	4	4			2		12	2				
	D	16	2	7	12	4	4			1	1	7	1				
Sorsogon	C				5												
	D				4												
Surigao	C	28	1	(2)													
	D	17	2														
Tarlac	C	1															
Siam	C	3		4	4	2	1	1	2	2		2	1				
	D	2		1	4	2	1	1	2	2		2	1				
Bangkok	C	1		3	3	2	1		1	2	1	1	2	2			
	D	1		2	2	2	1		1	2	1	1	1	1			
On vessel: S. S. Malwa from Shanghai	D		1														

[1] Figures for cholera in the Philippine Islands are subject to correction.
[2] During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, P. I.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		June, 1930	July, 1930	August, 1930	September, 1930			October, 1930			November, 1930			Dec. 1-10, 1930
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30	
Indo-China (French) (see also table above):														
Annam [1]	C	16	1	3										
Cambodia [1]	C	144	43	59	23	13	2	16		6		1		28
Cochin-China [1]	C	273	46	27	9	6	18	14	6	8		5		8

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		July, 27–Aug. 23, 1930	Aug. 24–Sept 20, 1930	Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Week ended— November, 1930 22	29	December, 1930 6	13	20	27	January, 1931 3	10	17	24	31	Feb. 7, 1931
Algeria:																	
Algiers	C	7	11	6	11			1	1	1				1		1	
	D				3												
Constantine, vicinity of	C				1						3	1	46				
Oran	C	4	10	10	2												
	D		1	3	1												
Plague-infected rats			10	6	1												
Philippeville	C		1	3	2								1				
	D			1									1				
Argentina.																	
Cordoba Province—Chazon	C								1						1		
Jujuy Province—Palpala	C															1	
Belgian Congo	C	2	5		1				1								
	D	2	3		1				1								
British East Africa (see also table below):																	
Tanganyika	C							3		2							
	D							3		2							
Uganda	C	236	262	165	171	37	17	33	24								
	D	229	191	164	168	37	18	33	24								
Canary Islands: Las Palmas	D	1															
Ceylon: Colombo	C	2	2	3	1	1		4	4	4		4	1	1	1		
	D	2	3	3	1	1		3	4	4		4	1		1		
Plague-infected rats					1	1	1										
China																	
Manchuria—Tungliau and Nungan	C	30	29	2													
Shensi	C		P		1												
Dutch East Indies:																	
Batavia and West Java	C	83	79	107	143	53	56	41	58	54							
	D	83	76	103	146	53	56	39	58	54							
Plague-infected rats		1	3														
Java and Madura	D	188	260	335	501	137	127	132	161	159	143						

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Week ended— November, 1930: 22	29	December, 1930: 6	13	20	27	January, 1931: 3	10	17	24	31	Feb. 7, 1931
Egypt:																	
Alexandria	C	11	10	9	7		1	1	2	1	1		1				1
	D	6	8	6	7				1								
Assiout	C				3		2		7	5	1		1	2	19	2	3
	D				1				1				1	2	2	2	
Aswan	C						3										
Beni-Suef	C	1												1			
Deirout	C														19	2	
	D														2	2	
Gharbieh	C	3														1	
	D	1														1	
Girga	C		1							3	1	3					1
	D										1	1					1
Manfalut	C												23	5	21	4	
	D												5	2	3	1	
Minieh	C								1						1	1	
Port Said	C	1			2												
France: Marseille	C		5	4	4												
Gambia	C	4															
	D	4															
Greece (see also table below). Pyrgos	C			2													
India	C	877	2,497	2,371	2,721	677	746	931									
	D	477	1,132	1,068	1,497	443	431	499									
Bassein	C		2		1								2	1			
	D		3										1				
Bombay	C		1	2	1										1		
	D		1	2	1										1		
Plague-infected rats		35	47	64	30	11	5	12	4	10	4	6	13	10			
Madras Presidency	C	81	127	196	185	33	62	28	25	30	4						
	D	34	57	110	124	24	26	15	13	14							
Rangoon	C	3	10	2	2						1	1					
	D	2	9	2	1						1						
Plague-infected rats		7	6	1	1	1	1			1				2			

India (Portuguese)	D	P			3												
Indo-China (see also table below):																	
Pnompenh	C	4	3	2		1	3	1	1	1				1	3		
	D			3	1	1	3	1	1	1				1	3		
Saigon and Cholon	C	1	1	1													
Iraq: Baghdad	C	9		1	P	2	2									3	
	D	3		1		1	1									2	
Kwang-Chow-Wan	C	1															
Madagascar (see also table below): Tamatave	C	2	1	1	5		2	1	1		2						
	D			1	3		2		1								
Morocco	C	15			5					9		10		13			
	D	2								4		4		4			
Nigeria: Lagos	C	7	6	5	38	4	3	2		2	1	1	1				
	D	7	6	5	5	4	3	2		2	1	1	1				
Plague-infected rats		8	10	11	13	1	1	1	2	4		1					
Peru: Lima.[1]																	
Senegal (see table below).																	
Siam	C	7	3	1	6												
	D	6	2		5												
Bangkok	C	3			1				1		1	2					
	D	2			1				1		1	2					
Nagara Rajsima	C	2	1	1	1		3		8	4	3	4	6	3			
	D	2	1	1	1		3		6	3	3	1	3	2			
Syria: Beirut	C	2	5		6								1				1
Tripolitania	C	2			1	4	6	2	1					2	2		
	D					1								2			
Tunisia:																	
Sfax district	C	1															
Tunis	C				1				P	12			1	1			
Union of Socialist Soviet Republics:																	
Salsk region	C	7															
	D	5															
Transcaucasia-Karabakh	C														6		
Union of South Africa:																	
Cape Province	C	1	1		1		P	P									
	D	1	1														
Orange Free State	C		2														
	D		2														
On vessel: S. S. Marionga de Thermiotis at Avonmouth	C										1						

[1] Eight cases of plague were reported at Lima, Peru, during December, 1930. Plague infection is said to exist in interior towns north of Lima.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
British East Africa (see also table above):							
Kenya	C	97	87	53	58	62	50
Greece (see also table above)	C				2		
Indo-China (see also table above)	C	1	2	4			
Madagascar (see also table above):							
Ambositra Province	C				4	16	
	D				4	16	
Antsirabe Province	C	24	11	21	3	10	
	D	24	11	21	3	10	
Miarinarivo Province	C	1	2	7	18	8	
	D	1	2	7	18	8	
Moramanga Province	C		27	18	20	8	
	D		27	17	20	8	
Tananarive Province	C	28	39	79	125		
	D	28	38	79	116		

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
Senegal:							
Baol [1]	C	62	79	48	53		
	D	48	20	23	35	4	
Dakar [1]	C	140	108	3			
	D	122	90	8			
Louga [1]	C	138	75	61	37	10	
	D	103	33	30	25	3	
Thies [1]	C	54	34	12	24	27	2
	D	30	20	4	15	23	1
Tivaouane [1]	C	119	110	20	53	31	2
	D	70	54	14	31	25	1

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Week ended November, 1930		December, 1930				January, 1931					Feb. 7, 1931
						22	29	6	13	20	27	3	10	17	24	31	
Algeria:																	
Algiers	C	3								1							
Bone	C															1	
Constantine	C				1												
Oran	C								3								
Brazil:																	
Porto Alegre (alastrim)	C	1	1	26	36	20	8										
Rio de Janeiro	C				2												
British East Africa (see also table below). Tanganyika	C	242	522	95	17	7	26	18	334	23	1	57					
	D	37	60	6	1		1		35	1		3					
British South Africa: Southern Rhodesia	C	1	1	153	95	12		4									
	D					2		1									
Canada:																	
Alberta	C	1	1	22		1						19			7		
British Columbia—Vancouver	C	6	2	2	3			1				1	2				
Manitoba	C		1														
Winnipeg	C												1				
Ontario	C	20	10	19	59	7	12	3	1	1		8	8	10	3		
Kingston	C										2	4		1			
North Bay	C										1		1				
Ottawa	C	7	5		37		8	1	1			2		1	1	1	
Sault Ste. Marie	C												1	11	8	5	6
Toronto	C		1				2	2									
Quebec	C	5				1			1						2		
Montreal	C	7															
Saskatchewan	C	8	1	3	2	2		16						7	6		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Week ended: November, 1930: 22	29	December, 1930: 6	13	20	27	January, 1931: 3	10	17	24	31	Feb. 7, 1931
China:																	
Changking	C	P	P	P	P	P		P	P	2							
Foochow	C	P	P	P	P		P		P								
Hong Kong	C										1						
Manchuria—																	
Harbin	C	2			1												
Kwantung—Dairen	C					2		1	1	1							
	D								1								
Nanking	C	P	P	P	P			P	P	P	P	P					
Shanghai—																	
Foreigners only	C	3	18	1	2			3	5	4	2	6	2	1	1		
Including natives	D		2		1				4	5	1	1	4	2	4		
Swatow	D	4	2	4	3	1			2		2	1	2				
Tientsin	C			1	1	1	1										
Chosen (see table below).																	
Colombia:																	
Barranquilla	C	2															
Buenaventura	C	2															
Cali	D			2				1									
Curacao (alastrim)	C	1															
Dutch East Indies:																	
Java—Batavia and West Java	C	12	11	14	26	2		2	2	2		2					
	D	5	4	4	4	1			1			1					
Sanggi Islands	C	36	14		29												
	D	2	3		3												
France (see table below).																	
Greece (see table below).																	
Great Britain:																	
England and Wales	C	344	341	325	372	116	160	95	137	138	135	164	228	187			
Bradford	C		3	1	1			1				1					
Cardiff	C			1													
Leeds	C			1	2							2					
London	C	164	120	29	172	67	27	48	42	27	38	48	48	45			

London and Great Towns	C	268	223	52	296	136	74	112	111	105	131	162	162	154			
	D		1		1		1										
Stoke-on-Trent	C	2	1		1												
Scotland	C	5															
Honduras:																	
Naco	C		5														
Puerto Castilla	C												4	7	1		
India	C	4,877	3,131	2,322	2,412	787	865	1,037									
	D	1,246	680	572	606	221	174	274									
Bombay	C	12	6	1				1				1	1	2			
	D	10	5					1				1	1				
Calcutta	C	25	14	12	9	3	5	6	4	10	19	15	15	28			
	D	21	9	11	7	3	2	4	2	7	13	10	10	16			
Cochin	C	14	3	12	25	4	5	6	7	6	7	2	5				
	D		1	1	3	2		2					1				
Karachi	C	4	4			2	1										
	D	3	2				1										
Madras	C	38	34	19	9	3	5	6	6		1	3	4				
	D	11	6	8	2			2	1			1					
Moulmein	C	2	1														
	D	1	1														
Negapatam	C	4	9	14	9	3		1	2								
Rangoon	C	3		2	1		1										
	D				1												
Tuticorin	C			1													
Vizagapatam	C			1													
India (French):																	
Chandernagor	C		3	3	3						5						
	D		2	1	1						2	1		1			
Karikal	C	9	5	1								1	2	1			
	D	9	2	1									2				
Pondicherry Province	C	22	35	38	11	7	7		5	8	8	7					
	D	22	33	36	11	7	5		5	7	8	7					
India (Portuguese)	C	9	4							1							
	D	2															
Indo-China (see also table below):																	
Pnompenh	C			2			1				2						
	D	1					1										
Saigon and Cholon	C	1	1		2	2	1		1					3	1		
	D	3	1		2	1			1					2			
Iraq:																	
Baghdad	C	1	1	2													
	D	1															
Mosul Liwa	C			69	6	7	9						1		2		
	D			27		1	1										
Ivory Coast (see table below).																	
Mexico (see also table below):																	
Jalisco (State) Guadalajara	D	1		3	3	1		2							1		
Juarez	C	2															
	D	1		1	1												
Mexico City and surrounding territory	C	10	12	13	9	1	2		3	1	5						
	D	6	5	3	2				6	2	1						
Vera Cruz	C				1												

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases: D, deaths; P, present]

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Week ended November, 1930: 22	November, 1930: 29	December, 1930: 6	December, 1930: 13	December, 1930: 20	December, 1930: 27	January, 1931: 3	January, 1931: 10	January, 1931: 17	January, 1931: 24	January, 1931: 31	Feb. 7, 1931
Morocco (see table below).																	
Nicaragua: Porto Cabezas	C									2							
Poland	C				8	1	2						2				
Portugal:																	
Lisbon	C	50	27	16	20	11		15	11	21	17		34	27		.	
Oporto	C	1															
Siam	C			1													
Somaliland, British: Boales	C			1	1			1					1				
	D			1													
Spain	C	2	5		51	23	21	23		19	31	18					
Straits Settlements	C	8	6	5	10	3	9	2	3	3		1	3				
	D	3	1	1	2	1	2		2	2							
Sudan (Anglo-Egyptian)	C	42	128	82	5		3		47		47		17	1	7		3
	D	3	52	7	1				5		5		1		7		
Sudan (French) (see table below).																	
Switzerland: Berne Canton	C	2		1													
Syria (see table below).																	
Tunisia: Tunis	C			2								13	4	6			
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C		P	P	P	P		P	P	P	P						
Orange Free State	C	P			2	P	P	P									
Transvaal	C	P	P	P	P	P	P	P	P	P	P						
Upper Volta	C						6						4				
On vessel:																	
S. S. Muncaster Castle at Manila from Hong Kong	C										1						
S. S. Matheran at Suez from Calcutta	C														1		

Place		June, 1930	July, 1930	August, 1930	September, 1930	October, 1930			November, 1930			December, 1930		
						1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31
Indo-China (see also table above)	C	213	238	93	192	32	62	164		86		38	9	14
Ivory Coast	C							4		2		9		
Sudan (French)	C	76	34	39	P		17					43		96
	D	18		3			2					16		4
Syria: Beirut	C	7	2	1										

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
British East Africa (see also table above):							
Kenya	C	186		424		653	
Chosen	C	3	2				
Seishin	C	2					
France	C	1					

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
Greece	C	1	6				
Mexico Durango (see also table above)	D	3	3	2			1
Morocco	C	3	8	4	4	20	
Turkey	C	51	21	19	74		
	D	13	4	2	1		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		July 27-Aug. 23, 1930	Aug. 24-Sept. 20, 1930	Sept. 21-Oct 18, 1930	Week ended— Oct. 25, 1930	November, 1930: 1	8	15	22	29	December, 1930: 6	13	20	27	January, 1931: 3	10	17	24
Algeria:																		
Algiers	C	2	3				1			2								
Constantine Department	C	3		2	1					1		1			3	3		
Oran	C	1	1	3						3		2						
Bulgaria	C	1	4	6			1	2	1	1	3	6	3				9	
	D												1					
China:																		
Manchuria—Harbin (see also table below)	C	2	2	1							1							
Shanghai	C	1																
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C	1	3	1				2	1	1								
	D		1					2										
Beheira Province	C		1										1					
	D												1					
Cairo	C	7	2									1	1					
Port Said	C	4	1	1	1	1												1
Ireland:																		
Irish Free State—																		
Mayo County—																		
Castlebar	C	1																
Westport	C	1																
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico:																		
Durango	D		1	2														
Mexico City, including municipalities in Federal District	C	9	7	8	1	1	5	4	1	1		12	5	2				
	D	2	2	2	1		3		2	3		2	4	1				
San Luis Potosi	D										1	1						
Morocco	C	8	2		1		1	1	1				8					
	D			1														
Palestine	C	3	3	3			2	1	1	6			1	1		2		1

Poland	C	34	23	22	7	8	15	7	12		21	9	18	5	28	11		
	D	3	1	2					1		3	3	3					
Portugal: Oporto	C	1		2		2	1	1	2	2	2							1
Rumania	C	9	4	14	4	13	10	14	19		15							
	D	2					1	1	1		2							
Spain	C		1	2			4				1							
	D		1	2							1							
Tunisia	C	10	6	12					5		23							
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P	P				
Municipality of East London	C		2	1				1	1				P		2			
Natal	C	P	P	2	P	P	P											
Orange Free State	C	P	P										P	P				
Transvaal	C	P	P	P	P	P	P	P	P	P			P	P				
Yugoslavia (see table below).																		

Place		June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930
China: Harbin (see also table above)	C		14	5		3	
Chosen: Seoul	C	2	3	2	1	7	1
Czechoslovakia	C	1		1			16
Greece: Athens	C	3	6	6	4	4	4
Latvia	C	3	3	1	2		
Lithuania	C	16	18	7	24	1	5
	D			1	2		1
Turkey	C	2	7	11		28	3
Yugoslavia	C	8		2		2	2
	D			1		1	

YELLOW FEVER

	Cases
Brazil:	
Campos, Rio de Janeiro Province, May 23, 1930	1
Para—	
June 23, 1930	2
July 29, 1930 (death)	1
Gold Coast:	
July 10, 1930	1
Albosso, Aug. 4, 1930 (death)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

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Rocky Mountain Spotted Fever Type of Virus Recovered in Eastern United States

Cases of Typhus-Rocky Mountain Spotted Fever Group in Eastern and Southeastern United States

A Psittacosis Outbreak from Infection in Love Birds

Prevalence of Influenza in the United States and Europe

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HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. Williams, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

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PUBLIC HEALTH REPORTS

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AN INFECTION OF THE ROCKY MOUNTAIN SPOTTED FEVER TYPE

Identification in the Eastern Part of the United States

By L. F. BADGER, *Passed Assistant Surgeon*, R. E. DYER, *Surgeon*, and A. RUMREICH, *Passed Assistant Surgeon, United States Public Health Service*

In connection with studies of cases of disease of the typhus-Rocky Mountain spotted fever group occurring in the eastern part of the United States (1), attempts were made to establish strains of the viruses in animals. Three of the cases from which blood was drawn for animal inoculations were residents of northern Virginia. From these three cases, strains of virus were established in guinea pigs. These strains are apparently closely related to, or identical with, Rocky Mountain spotted fever.

The first, or R strain, was obtained by inoculating into each of four guinea pigs 4 c. c. of whole blood obtained from case V-8 on the tenth day of the disease.

The second, or T strain, was obtained from case V-20 by inoculating into each of three guinea pigs 4. c. c. of whole blood obtained on the seventh day of the disease.

The third, or H strain, was obtained from case V-21 by inoculating into each of two guinea pigs 4 c. c. of whole blood obtained on the sixth day of the disease.

The R strain was carried in guinea pigs for eight generations, when it was discontinued. The T and the H strains have been continued and are now in the twenty-ninth and thirtieth generations, respectively.

In the first 25 generations of the T and H strains 170 transfers have been made, using 674 guinea pigs. Of these animals, 28 died too early for the determination of any reaction to the inoculations, and 29 showed definite evidence of complicating infections. Of the remaining 617 guinea pigs, 558, or 90.4 per cent, reacted positively. The transfers have usually been made by intraperitoneal inoculation of whole cardiac blood or of brain emulsion made by emulsifying the brain in 20 c. c. of normal salt solution.

The identity of the T and H strains was determined by cross-immunity tests in guinea pigs. It was found that guinea pigs which had recovered from infection with the T virus failed to react when subsequently inoculated with the H virus and likewise those having recovered from the H virus were subsequently immune to the T virus.

In each test fresh guinea pigs were employed as controls. Further check upon the tests was made in some instances by inoculating guinea pigs which had recovered from the homologous strain at the same time that the guinea pigs to be tested and the fresh guinea pigs were inoculated.

THE DISEASE IN GUINEA PIGS

The incubation period varies, being in the majority of instances from two to six days. There is a definite tendency toward a slightly shorter incubation period following blood inoculations as compared with that when brain emulsion is used. The febrile period lasts from 5 to 10 days, with the temperature ranging between 40° and 41° C. In a few instances guinea pigs failed to manifest any febrile reaction but subsequently were immune to a second inoculation with the same virus—a fact suggesting the occurrence of an inapparent infection. Death occurred in approximately 25 per cent of the guinea pigs reacting. In only one instance was there observed any suggestion of scrotal involvement. In this animal mild redness and swelling of the scrotum occurred during the febrile period. Transfers were made from this guinea pig by blood, brain tissue, and testicular washings, none of which transfers resulted in reactions involving the scrotum.

Post-mortem examination revealed enlarged, dark red, smooth spleens. The brains of 14 guinea pigs have been examined microscopically and many showed the occurrence of small focal cellular glioses and occasional adventitial lymphocyte infiltration and fibroblast proliferation about capillaries and more or less pial lymphocyte infiltration.

THE DISEASE IN MONKEYS

Of eight monkeys (*Macacus rhesus*) inoculated with guinea pig passage virus, four developed a febrile reaction from five to seven days after inoculation. The temperatures ranged from 40° C. to 41.4° C. Fever lasted from five to nine days. Death occurred in one instance. A rash developed in two monkeys, one of which had no febrile reaction. This rash appeared as a maculo-papular petechial eruption. In one animal this was limited to the face, while in the second the brows, face, ears, upper arms, thighs, and buccal mucosa were involved. Microscopic examination of sections of skin from the monkey which died showed frequent capillary endothelial necrosis and thrombosis, pericapillary hemorrhages, and numbers of fragmented leucocytes in and about the thrombosed capillaries.

Agglutination tests[1] with *proteus* X_{19} (type O) were made with blood serum from each of the eight monkeys. Of the four monkeys

[1] Karlee and Spencer, Pub. Health Rep., 1929, vol. 44, pp. 179-182, and Spencer and Maxcy, Pub. Health Rep., 1930, vol. 45, pp. 440-446, have reported on agglutinins, for certain *proteus* strains, in the blood in connection with Rocky Mountain spotted fever.

that had developed a febrile reaction following inoculation with virus, the serum of one showed a slight increase in agglutinins, the second gave complete agglutination in the 1:40 dilution and partial in 1:80, the third gave complete agglutination in 1:320, partial in 1:640 and 1:1280, while the fourth gave complete agglutination in 1:640 and partial in 1:1280. The serum from one of the monkeys which had failed to show clinical signs of the disease gave complete agglutination in the 1:640 dilution and partial in 1:1280.

Microscopic examination of brain sections from the monkey which developed a rash and later died showed a few patches of pial infiltration by lymphocytes, plasma cells, and macrophages; slight glia cell accumulation along a few vessel sheaths; hemosiderin phagocytes in sheath of one arteriole; moderate adventitial and intimal proliferation on one side of one arteriole; one paravascular oval focus of small-celled gliosis.

THE DISEASE IN RABBITS

Ten male rabbits were inoculated, four with emulsion of brain tissue and six with whole blood of guinea pigs in the third or fourth day of fever. Two of the four inoculated with brain tissue and three of the six inoculated with blood developed febrile reactions after incubation periods ranging from four to seven days. Four of the five which reacted with fever also exhibited involvement of the scrotum, which began as redness and swelling followed by ulceration and sloughing. Of the five reacting clinically, only two have progressed far enough to determine the Weil-Felix reaction with their sera; both of these showed the development of agglutinins. Sections of the skin of the scrotum in two cases were examined microscopically. The reports of the microscopic examinations were as follows:

Rabbit H 3.—Skin of scrotum: Numerous thickened capillaries, often with adventitial fibroblast proliferation, sometimes with lymphocyte infiltration, frequently with pericapillary hemorrhage. Much diffuse edema and increase in size and number of fibroblasts. Epithelium partly denuded. There is diffuse lymphocyte and plasma cell infiltration.

Rabbit H 4.—Skin of scrotum: The corium is swollen, edematous, and necrotic. There is a zone of demarcation on the deep side, which is densely infiltrated in the surviving area by polymorphonuclear leucocytes and over the margin of necrosis by closely packed pyknotic nuclear fragments. The vessels in the necrotic corium are dilated, some blood filled, others thrombosed by masses of laked and fragmented red and white corpuscles. The subjacent subcutaneous tissue contains many lymphocytes as well as the above noted leucocytes. There is partial coagulation necrosis of the epidermis.

IDENTITY OF THE DISEASE, WITH RESULTS OF CROSS-IMMUNITY TESTS

Since endemic typhus has been reported from the same locality in which the disease under study occurs, a determination of the relation between these two diseases was first attempted. The endemic typhus strain used in this study was isolated from a human case in Wilmington, N. C., in 1928 by Maxcy (2).

The reaction in the guinea pigs produced by the virus of endemic typhus is less severe and the appearance of the spleen is much less altered than following inoculations with the T or H strains of virus. In endemic typhus in male guinea pigs, involvement of the genitalia is the rule; while in guinea pigs inoculated with T or H strains of virus, involvement has been noted only once in 600 male guinea pigs.

No evidence of cross immunity between the Wilmington strain of endemic typhus virus and either the T or H strains of virus has been obtained. In each cross-immunity test fresh guinea pigs have been used as controls, and in a few instances further check has been made by inoculating guinea pigs that have recovered from inoculations with the homologous strain at the time when the fresh guinea pigs and the ones to be tested were inoculated.

The relation of the T and H strains of virus with European typhus virus has also been studied in guinea pigs. The strain of European typhus used was isolated at the Institute of Hygiene, Warsaw, Poland, prior to 1926 and brought to the National Institute of Health by Doctor Maxcy in 1928.

The reaction of guinea pigs to the T and H strains of virus is more severe than the reaction to European typhus virus. The incubation period is shorter, deaths occur in guinea pigs apparently uncomplicated by secondary infections, and the spleen is as a rule much larger.

No evidence of cross immunity between European typhus virus and either the T or H strains of virus was obtained. All cross-immunity tests were controlled by inoculating fresh guinea pigs and in some instances further by inoculating guinea pigs recovered from inoculation with the homologous virus with the same dose of the same material.

The relation of the T and H strains of virus to Rocky Mountain spotted fever was studied in guinea pigs and monkeys. The strain of Rocky Mountain spotted fever virus used in the studies was recently obtained from the Bitterroot Valley of Montana.

There occurs a variation between the two diseases in the reaction in guinea pigs. The reaction to the T or H virus is less severe. Approximately 25 per cent of guinea pigs uncomplicated by secondary infections inoculated with T or H virus die, while death is the rule with a well-established strain of Rocky Mountain spotted fever virus. Involvement of the scrotum commonly occurs in the latter, while in the former it has so far been noted in only one instance. In this instance there was evidence of redness and swelling of the skin of the

scrotum, but the tunica appeared normal on examination. The blood, brain, and testicular washings from that guinea pig were each inoculated separately into fresh guinea pigs. None of these showed any involvement of the scrotum.

In guinea pigs the appearance of the spleen following inoculation with T or H virus is apparently identical with reactions occurring subsequent to inoculation with Rocky Mountain spotted fever virus.

Guinea pigs recovered from the disease produced by the T or H virus apparently develop a definite immunity to subsequent inoculations with Rocky Mountain spotted fever virus. In each test fresh guinea pigs were used as controls, being inoculated with the same dose of the same material at the same time. The temperature records of four guinea pigs following inoculation with T or H virus are tabulated in Table 1. There are also shown the temperature reactions of these guinea pigs and of four fresh guinea pigs inoculated with 1.5 c. c. of whole blood obtained from a guinea pig on the fourth day of fever following inoculation with Rocky Mountain spotted fever virus.

TABLE 1.—*Daily temperature records of guinea pigs inoculated with T virus and of guinea pigs inoculated with H virus, all later inoculated with Rocky Mountain spotted fever virus, and records of control animals*

Guinea pig

H 291	H 294	TM 20	MT 60	Fresh	Fresh	Fresh	Fresh
[1]38.7	[1]39.1	[2]39.4	[2]39.2				
38.6	38.8	39.5	38.9				
38.9	38.7	39.3	38.9				
39.3	39.5	39.0	38.9				
39.7	39.3	39.5					
39.5	40.0	39.6	39.3				
40.0	40.3	40.5	41.0				
39.7	40.2	40.3	41.3				
			41.2				
39.8	40.2	40.5	40.5				
39.7	40.1	40.6					
39.6	39.7	40.2					
	39.8	39.7	40.3				
	39.3	39.6	40.0				
		40.0	40.1				
			40.1				
		39.1	39.8				
		39.3	40.0				
12-day interval.	10-day interval.	6-day interval.					
			40.5				
			39.7				
			6-day interval.				
([3])	([3])	([3])	([3])	[3]39.2	[3]39.1	[3]39.2	[3]39.1
38.8	39.2	38.8	39.3	39.0	38.8	38.7	39.0
38.8	39.5	39.1	38.7	39.1	38.8	39.1	38.6
38.5	39.4	38.8	39.0	39.1	39.5	40.5	39.4
38.8	39.1	38.8	38.7	39.7	39.8	[4]40.2	40.1
38.9	39.4	39.1	39.1	[4]40.4	[4]40.8	[4]41.0	[4]40.3
39.6	39.5	39.2	39.0	[4]40.9	Dead.	[4]41.2	[4]41.0
38.6	39.4	39.0	38.5	[4]40.8		[4]40.9	[4]41.2
38.5	39.0	39.2	38.7	[4]40.6		[4]40.0	([5])
38.5	39.0	39.0	39.0	[4]39.5		38.5	
38.5	39.0	39.0	39.0	[4]39.3		Dead.	
38.5	38.8	38.7	38.7	[4]39.2			
38.7	38.8	38.5	38.3	[4]38.0			
38.7	39.2	39.3	39.7	Dead.			
38.3	39.6	39.2	39.3				

[1] Inoculated with H virus.
[2] Inoculated with T virus.
[3] Inoculated with Rocky Mountain spotted fever virus.
[4] Redness and swelling of scrotum.
[5] Killed for transfer.

Due to the high mortality of guinea pigs following inoculation with Rocky Mountain spotted fever virus, there has been available but one recovered guinea pig to test for immunity to the T or H virus. A male guinea pig was inoculated intraperitoneally on November 25, with 1 c. c. of Rocky Mountain spotted fever blood virus obtained from a guinea pig on the fourth day of fever. This guinea pig reacted with fever after an incubation period of one or two days and had moderate involvement of the scrotum. Twenty days after this inoculation the guinea pig was reinoculated with T brain virus, obtained from a guinea pig in the fourth day of fever. Two fresh guinea pigs were inoculated with the same virus. Both of the fresh guinea pigs reacted after incubation periods of one and four days, respectively, while the guinea pig recovered from Rocky Mountain spotted fever failed to react. In Table 2 are tabulated the febrile reactions in these pigs.

TABLE 2.—*Daily temperature records of a guinea pig inoculated with Rocky Mountain spotted fever virus and later inoculated with the T virus, and records of control animals*

Guinea pig		
S. F. 1	Fresh	Fresh
(1) 39.3		
39.7		
40.1		
40.7		
[2] 40		
[2] 39.6		
12 day interval.		
[3] 39.3	[3] 39.2	[3] 38.6
38.3	38.2	39.5
38.8	38.5	39.7
38.7	39.5	39.8
39.0	39.2	40.0
39.5	39.8	40.5
39.7		
39.1	40.0	40.6
39.4	39.6	40.0
39.2	39.4	39.8
39.4	39.0	38.6
39.2		
39.2		

[1] Inoculated with Rocky Mountain spotted fever virus.
[2] Redness and swelling of scrotum.
[3] Inoculated with T virus.

The reactions in monkeys following inoculations with T or H virus are similar to but less severe than those reported for monkeys inoculated with Rocky Mountain spotted fever virus. Wolbach (3), in 1919, inoculated four monkeys with Rocky Mountain spotted fever virus, all of which died. Spencer (4) inoculated five with the same result. Of four monkeys which ran a febrile course following inoculation with the T or H virus, three lived.

One monkey which had recovered from infection with T virus and one recovered from H virus were subsequently inoculated with Rocky Mountain spotted fever virus. These monkeys failed to show any reaction, while a fresh monkey inoculated with the same dose of the same material reacted with fever and rash. This monkey died on the thirteenth day after inoculation. The temperature records of the monkeys used in this test are shown in Table 3.

TABLE 3.—*Daily temperature records of a monkey inoculated with T virus and a monkey inoculated with H virus and both later inoculated with Rocky Mountain spotted fever virus, and record of the control animal*

Monkey					
348		347		Fresh	
A. M.	*P. M.*	*A. M.*	*P. M.*	*A. M.*	*P. M.*
[1] 38.8					
38.8					
38.9		[2] 39.0			
38.2		39.0			
39.4		39.0			
39.4		39.7			
40.2		39.4			
40.1	40.8	40.4	40.4		
40.2	40.6	40.4	40.8		
40.2	-	40.7	40.7		
40.2	40.4	40.4	-		
40.0	40.2	40.8	40.6		
39.4	39.0	40.8	40.4		
39.6	38.0	40.0	-		
39.3	39.6	40.1	40.8		
-	-	40.0	40.1		
-	-	39.6	39.4		
-	-	38.6	38.8		
-	-	38.9	38.9		
-	([3])	-	([3])	39.3	[3] 38.6
-	38.6	-	38.8	39.2	39.1
36.3	38.3	39.0	38.8	39.3	39.1
38.8	38.8	39.0	39.2	39.5	39.0
38.3	38.8	39.2	39.3	39.4	39.5
38.2	38.8	39.1	39.2	40.3	40.5
38.8	39.0	39.0	39.1	40.5	40.1
38.3	38.1	38.5	38.6	40.1	39.8
38.8	39.0	38.9	39.0	40.2	40.1
38.1	38.6	38.5	38.8	40.5	40.8
38.0	38.6	38.8	39.1	-	40.7
37.8	38.5	38.5	38.7	36.7	Died.
38.2	38.7	38.7	38.5		
38.5	38.6	38.6	38.8		
88.7	39.2	38.8	38.7		
39.0	39.1	38.9	38.9		
39.3	39.3	38.8	38.8		
38.8	39.3	38.8	39.1		

[1] Inoculated with T virus.
[2] Inoculated with H virus
[3] Inoculated with Rocky Mountain spotted fever virus.

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THE TYPHUS-ROCKY MOUNTAIN SPOTTED FEVER GROUP

An Epidemiological and Clinical Study in the Eastern and Southeastern States

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In connection with the investigation of endemic typhus in the Eastern States, an epidemiological study was begun in April, 1930. It became evident very early in the course of our field investigations that many of the cases observed by us differed materially in clinical respects from the disease described by Brill, Maxcy, and others.

Maxcy had described cases of a mild endemic typhus occurring in cities in the Southeastern States and had presented epidemiological evidence of a rodent reservoir of the disease and of some ectoparasite of the rat as the probable vector.

Early in our studies it was noted that most of the cases living in rural districts in the northern tier of the States covered by our investigation, and urban dwellers vacationing in the country, suffered from a very severe disease, which did not correspond to the clinical picture of endemic typhus, and which resembled the spotted fever of the Rocky Mountains more closely than it did any other disease. A quite high proportion of these cases gave a history of tick bite within a short time preceding onset. Furthermore, there was seldom evidence of rodent infestation in association with these cases.

In this report a partial analysis will be made of 100 selected cases, separated, on the basis of epidemiologic considerations, into two groups of equal size. Most of the cases were visited at least once during the acute stage, and many were observed repeatedly. Much of our clinical data, however, were supplied by members of the medical profession who attended the patients.

The first group, essentially urban, consists of persons who in most instances had not left city environment. These cases are clearly New World endemic typhus, already well described by Maxcy and others. The other group, composed of cases of known or presumed rural origin, which frequently followed tick bite or occurred under conditions making tick bite possible, is clinically Rocky Mountain spotted fever, or a disease clinically indistinguishable from it.

The following are histories of representative cases from each group:

CASES OF ENDEMIC TYPHUS

Case F-9-T.—White; male; age, 46 years; cigar maker. Patient became ill on June 13, with dizziness and general aching. He worked the following day, but after that took to bed. His fever at no time exceeded 103.3° F.; on the fourteenth day his temperature became normal. The pulse was slow. There was a slight conjunctivitis. The patient was drowsy most of the time. On the fifth day the eruption appeared, first in the lower part of the axillæ and on the medial surfaces of the upper arms, next on the chest, upper abdomen, and back. There was no further extension. The lesions were macules which disappeared on pressure. After the ninth day, there was no evidence of the rash. The white blood cell count was 5,800 on the ninth day. The urine was free of albumin. The Weil-Felix reaction was positive in a dilution of 1:160 on the ninth day. The patient made an uneventful and prompt recovery.

There was no history of contact with a previous case. The patient's time had been divided between home, factory, and coffee shop. He lived and worked under good sanitary conditions. The coffee shop, where he spent several hours of leisure time each day, was heavily infested with rats. There was no history of any insect bite. Several other persons who frequented this coffee shop had developed typhus, although all lived and worked under good sanitary conditions.

Case G-226-S.—White; male; age, 34 years; druggist. After a period of malaise lasting two or three days, during which time his throat was quite sore, the patient was seized with a severe chill at 11.30 p. m. on December 5. This was followed by a rapidly rising temperature, headache, and pains in the back of neck, back, and limbs. These symptoms continued for two days, after which there was a 36-hour interval of comparative comfort. The same symptoms, with the exception of the sore throat, then returned. The fever attained a maximum of 104.7° F. on the seventh day, and dropped to normal on the fifteenth day. In 12 hours, however, fever reappeared, and continued for two days more. The pulse rate ranged from 80 to 110. The patient suffered with insomnia, and was quite depressed and irritable. The rash appeared on the fifth day, at first over the epigastrium, then on the chest, flanks, and back, and the flexor surface of the upper arms. It was maculo-papular when fully developed, and at no time involved the wrists and ankles, or the face. It began to fade in the middle of the second week, and before the end of that week there was no trace of it. The Weil-Felix reaction was positive in a dilution of 1: 640. The white blood count was 7,600. The urine contained a trace of albumin.

The sanitary conditions of the dwelling were satisfactory. The place of employment was adjacent to a grocery and feed store, and was heavily rat-infested. The patient's avocation for five or six weeks prior to onset of illness had been the trapping of these rats. In this he was assisted by a fellow employee. The rats were caught in cage traps and taken to a back lot and killed with chloroform. Swarms of fleas were observed on these rats. The patient stated that he was bitten by fleas several times, but recalled no dates. On November 22 the assistant trapper came down with typhus fever. Five other employees of the establishment remained well.

Case M-41-B.—White; male; age, 42 years; policeman. Patient was in good health until December 11, when he had a chill at about 6 p. m. This was followed by generalized aching and fever. His throat was sore for several days. He was constipated. On the third day he was nauseated, and vomited. There was an unproductive cough for a few days. The fever attained a maximum of 103° F. on the ninth day, then receded gradually to a maximum of 101.4° F. on the thirteenth day. On the fourteenth day it dropped to normal and all symptoms subsided, but there was a low grade febrile exacerbation which started on the fif-

teenth day and lasted about 10 days. The patient was lethargic but complained of severe frontal headache. The conjunctivæ and the pharyngeal mucosa were markedly injected. The spleen was not palpable. A scant maculopapular rash developed on the chest and abdomen on the fifth day. On the ninth day this involved also the back, and there were a very few lesions on the arms. The rash disappeared before the end of the second week. The leucocyte count was 10,300. The urine was free of albumin. The blood serum agglutinated *proteus* X_{19} in a dilution of 1:100 on the tenth day, and 1:200 on the nineteenth day.

The patient's home was free of rodents. There was no known contact with a previous case. The patient's duties included patrolling a large market place. For amusement at night he shot rats with a small caliber rifle, in competition with another officer. After a period of shooting, the rats were collected and counted. Eleven days before onset of illness after reaching his home he discovered a red, raised itching lesion on his left ankle that he and his wife regarded as an insect bite.

Case M-43-B.—White; male; age, 26 years; laborer. Patient's illness began on the afternoon of December 24 with chills, generalized aching, and fever. On the next day he was nauseated. Fever lasted 14 days, attaining a maximum of 104.4° F. on the ninth day, with marked morning remissions, and terminating by crisis. There was, on the twelfth day, a pseudocrisis. The patient was drowsy but always oriented. He complained of headache, and was constipated. The face was flushed, the conjunctivæ markedly injected. The tongue was coated. The pharyngeal mucosa was injected, the breath fetid. The spleen could not be felt. Reflexes were normal. On the sixth day a red maculo-papular rash appeared on the chest. On the eighth day this was generalized, but did not involve the palms, soles, or face. It was most abundant over the chest. Most of the lesions disappeared on pressure. The leucocyte count was 6,100 on the thirteenth day. The urine did not contain albumin. The Weil-Felix reaction was positive in a dilution of 1:100 on the ninth day, and 1:2560 on the fourteenth day. Recovery was uneventful.

The patient lived, during the two weeks preceding illness, on the ground floor of a tenement house in a poor section of a large eastern city. He had been out of work for several months. He slept on the kitchen floor, and was frequently awakened by rats, which would run over his pallet. He was bitten by fleas several times. A year old infant, who slept in a crib in the same room, remained well. The other members of the household denied insect bites. The premises were heavily infested with *Rattus norvegicus* which, however, were confined to the basement and ground floor. Live rats obtained on these premises were found to be infested with the fleas *Xenopsylla cheopis* and *Ceratophyllus fasciatus*, and the common rat mite *Echinolaelaps echidninus*.

CASES OF THE ROCKY MOUNTAIN SPOTTED FEVER TYPE

Case V-4.—White; female; age, 6 years; school girl. On the afternoon of May 2 patient came home from school with flushed face and felt chilly. The next day she remained in bed, complaining of headache. Her temperature was 103° F. She complained of pain in the back of the neck and aching of the upper arms and the thighs. She was constipated and had no appetite. She vomited on the third and fourth days. By the fourth day the fever had risen to 105° F., and continued, with morning remissions of 3° to 4°, for a total of 15 days, becoming normal by rapid lysis. There was mild delirium in the second week. The spleen was palpable. On the fifth day a faint rose rash appeared on the arms and legs. This was not discernible in the mornings for several days thereafter. On the tenth day the rash was generalized and definitely petechial. The rash was most pronounced

over the forearms, the calves and ankles, the extensor surface of the upper arms, the shoulders, and the back, in the order enumerated. There were a few spots on the thighs and buttocks, the chest and abdomen, the palms and soles, and the face. The Weil-Felix reaction was positive in serum dilution of 1: 160 on the tenth day. Convalescence was fairly rapid, with prompt restoration of a normal psyche and sensorium. After defervescence there was a branny desquamation over the calves and forearms.

The patient had lived her entire lifetime in an old farmhouse located in a large clearing in a heavily forested area. She had not been out of the immediate vicinity for several months. Home sanitation was above reproach. There was no evidence of rodent infestation. Six days prior to onset of illness a yearling tick (nymph) was found attached to the skin in the right axilla and was removed by the child's mother. This tick was noticed while the child was being dressed in the morning. At the height of the illness there was discernible at the site of the bite a scab-covered ulcer about 1 centimeter in diameter. The axillary lymph nodes on this side were considerably larger than those on the opposite side. There was no other history of bite by any arthropod in the patient or in any of the other members of the family of seven persons.

Case M-7.—White; female; age, 40 years; housewife. Patient was taken ill on May 8 with a frontal headache. She remained up and about until two days later, when she had a slight chill, abdominal pain, nausea, and vomiting. This was followed by rising temperature which reached a maximum of 105° F. on the seventh day; it remained near this level for nine days, with morning remissions of 1° to 2°, then receded gradually, touching normal on the morning of the twenty-third day. An afternoon elevation of 1° to 1½° continued for another week. The pulse ranged from 90 to 120. At onset and during the first week there was constipation; from the tenth to the seventeenth day urination and defecation were involuntary. There was a slight conjunctivitis. The face was flushed. The tongue was dry and coated, with red edges. The spleen was slightly enlarged. A mental confusion observed during the first few days was succeeded by stupor, with episodes of violent delirium. There was some cervical rigidity. A macular rash appeared on the seventh day, and became petechial within four days. It was generalized, but most pronounced on the wrists and ankles. Evidences of it persisted for some weeks after recovery. The white blood cells numbered 20,700 on the tenth, 18,800 on the fifteenth, and 11,600 on the twenty-first day. The urine contained a trace of albumin and a few granular and hyaline casts. The blood serum agglutinated *proteus* X_{19} in a dilution of 1: 1280.

The patient lived in a semirural community. There was no rodent infestation of the premises, and the sanitation in general was above reproach. On two occasions, one 10 days and the other 4 days prior to onset, she visited a large city near by. There was no other travel. Her only occupation aside from housework was tending the garden, which is located at the edge of a forest. At some not definitely ascertainable time between the two visits referred to above, she found, on returning from her gardening, a small tick attached to the leg. No lesion was observed at this point. She had no knowledge of any other bites by arthropods. Other members of the family had not been bitten by any insect or arachnid.

Case V-8.—White; male; age, 19 years; hunter and trapper. In the evening of May 15 patient felt dizzy and chilly. He spent a few hours in the woods the next morning, but in the afternoon was feverish and remained at home. The next day he had a severe frontal headache, pains in the calves of the legs, and a high fever. He was nauseated, and vomited several times. His fever ranged from 101° F. to 104.8° F., with morning remissions. Defervescence was by lysis, the temperature becoming normal on the twenty-second day. The headache continued for 16 days. The patient was constipated during the first week. Nausea was frequent.

Vomiting of green fluid recurred at irregular intervals for two weeks. The pulse ranged from 100 to 130 per minute, and was full and of good tension. On the tenth day he became irrational, and was at times very noisy and quarrelsome, getting out of bed several times. These episodes continued for a week, alternating with periods of stupor, verging on coma. Urination and defecation were involuntary during this week. After the end of the second week, and until subsidence of fever, the patient perspired copiously several times daily, notably during the first part of the night. The face was dusky. There was a slight conjunctivitis. The tongue was dry and coated, with red edges, the lips were cracked, and the pharyngeal mucosa was moderately injected. The spleen was palpable. There were abrasions on two fingers of the right hand, and a crusted lesion about 2 centimeters in diameter over the left lateral malleolus. On the sixth day a macular rash was noticed on the arms and legs. Within three days this had extended to all parts of the body. The rash was barely discernible in the mornings, but in the afternoon, with increased fever, it was distinct. By the tenth day it had become definitely petechial, especially over the extremities. The spots ranged from 1 to 5 millimeters in diameter and from a lurid red to a dusky purple. The purpuric spots were most numerous over the wrists and ankles, and many of them coalesced. They were quite pronounced also over the shoulders and the upper back. Over the chest and abdomen the spots were few, with macules predominating. On the face and the palms and soles the eruption was exclusively macular. The rash attained its maximum development by the end of the second week, then faded gradually. Evidences of it persisted, however, for several weeks on the arms and ankles, as purplish brown spots which became very prominent when a tourniquet was applied. Convalescence was slow, with prolonged weakness but a fairly rapid clearing of sensorium. The leucocyte count was 18,000 on the fifteenth day. The urine contained a trace of albumin throughout the febrile period. The blood serum agglutinated *B. proteus* X_{19} in a dilution of 1:160 on the tenth, and 1:640 on the fourteenth day.

The patient had for several months been hunting and trapping, day and night, in a thickly wooded region. He lived in a house, located in a large clearing, the sanitation of which was satisfactory. There was no rodent infestation. He had not been in contact with a previous case. He denied knowledge of any insect bite. Three days before onset of present illness he noticed that his four dogs were heavily infested with ticks. He removed a large number of the engorged ticks and crushed them between two pebbles. In so doing he smeared a considerable quantity of blood and tick juice on his hands. He then wiped his hand on a dog's hide. The one other occupant of the house had not been bitten by any insect this year.

Case V-13.—White; female; age, 33 years; clerk. On the evening of June 29 patient felt weak and dizzy and slightly nauseated. Toward noon of the next day she had a chill, lasting nearly half an hour, followed by a sweat. By the afternoon of the fourth day her fever had reached 103.4° F. During the latter part of the first week and during the entire second week it reached 103.6° F. to 105° F. each afternoon, with marked morning remissions of 4° to 5°. In the third week the daily maximum was about 2° lower. On the twenty-second day the temperature first receded, temporarily, to normal, and two days later became permanently normal. The pulse ranged between 88 and 116. She complained of pains in the shoulders, but not of headache. There were several chills in the first week. The tongue was dry and coated. The spleen and liver were not palpable. There was a moderate conjunctivitis. The mental condition was one of apathy. A maculopapular rash was first noticed on the extremities on the seventh day. At the end of the second week it was most marked on the arms, and involved also the trunk, but not the face. It was then definitely petechial. The

lesions persisted for some weeks after subsidence of fever, being particularly evident after application of a tourniquet. The white blood cells numbered 11,200 on the twelfth day, with 69 per cent polymorphonuclear neutrophiles and 29 per cent lymphocytes. The urine contained a faint trace of albumin. The blood serum agglutinated *proteus* X_{19} in a dilution of 1 : 320 on the twentieth day, and 1 : 5,120 a week after defervescence. There were no complications, but convalescence was protracted.

The patient lived in a suburb of a large city, under good sanitary conditions. On the day preceding her initial symptoms, she found an engorged tick attached to the scalp back of the left ear. She had been in a forest several miles distant two days before, and had brushed several ticks off her person at that time. The four other members of the household denied bites by ticks or any insects during this year.

CLINICAL FEATURES

Onset.—The onset was abrupt enough in the majority of cases in both groups so that a definite hour of onset could be stated. This was generally in the late afternoon or early evening. In some cases this had been preceded by a period of lassitude, malaise, or restlessness, lasting from one to seven days. The initial symptoms were, in general, quite similar in both diseases, and were usually a chill or chilliness, headache, fever, anorexia, and prostration. In the Rocky Mountain spotted fever type cases the generalized aching was more prominent, and several of them complained of pain in the neck; occasionally there was abdominal pain.

Fever.—The fever reached 102° to 105° F. in from 3 to 10 days, and was characterized by morning remissions of 1° to 3° F. In some of the more severe Rocky Mountain spotted fever type cases the remissions were not marked, or were absent. The maximum temperature recorded in the endemic typhus group was 105.2° F.; in the Rocky Mountain spotted fever type 107.2° F.; there was considerable variation in the maxima in both groups. The duration of fever in the two diseases is shown in the table. Defervescence was generally by rapid lysis, less frequently by lysis or by crisis.

Duration of fever in cases that recovered

Days	Number of cases		Days	Number of cases	
	Endemic typhus	Rocky Mountain spotted fever type disease		Endemic typhus	Rocky Mountain spotted fever type disease
11	4	1	17	0	4
12	2	0	18	0	2
13	5	2	19	0	0
14	28	4	20	0	4
15	9	8	21	0	11
16	2	2	22	0	5

Rash.—In endemic typhus the rash was observed first between the fourth and sixth days, but almost invariably on the fifth day. It appeared first on the chest and abdomen, particularly over the lower ribs anteriorly and laterally and over the upper abdomen, and frequently, in addition, on the medial surfaces of the upper arms, less often also on the flexor surface of the forearms and on the shoulders. In many cases there was no further extension; in a goodly number the back was next involved; and in more severe cases the eruption became pretty well generalized. It was never observed on the face in this series and in only one case were the palms and soles involved. The rash consisted of macules varying from a rose to a dull red color, 2 or 3 millimeters in diameter with rather poorly defined margins. These lesions would fade, but usually did not completely disappear, on pressure. In some cases many of the lesions were papular. The rash was in evidence for two to nine days, then rapidly disappeared. There was seldom any vestige of it by the time of defervescence. In two patients no rash was observed at any stage; one of these was a negro.

In the Rocky Mountain spotted fever type of cases the rash appeared between the third and seventh days, most frequently on the fifth or sixth day, but quite often on the third or fourth. The site of first appearance was nearly always the wrists and ankles. The rash was usually next noted on the back, then rapidly became generalized. The palms and the soles were involved quite frequently, the face occasionally, the scalp rarely. The extension was complete in two to three days. The lesions were at first faint roseolous macules, 2 to 6 millimeters in diameter. They would often fade in the mornings and reappear with the afternoon rise of fever. They grew more distinct from day to day, and by the middle of the second week were definitely petechial in all but the mildest cases. When seen at this stage and subsequently the rash was purpuric, and as a rule most abundant on the wrists and ankles, the legs, the upper part of the back, the shoulders, the lateral surfaces of the arms, the chest, abdomen, palms and soles, and the face, in the order mentioned. These petechiæ, when numerous, often became confluent; this was most often seen on the ankles. In cases with a well developed purpuric rash evidences of the rash often persisted for several weeks in the form of dusky purplish or yellowish brown spots, which were well brought out by a hot bath or by application of a tourniquet. In several of these cases there was seen a branny desquamation of the legs, commencing late in the disease or early in convalescence.

Physical findings.—At the height of the illness in both groups of cases the face was flushed, sometimes dusky, the tongue dry and coated, sometimes with red tip and edges. The pharyngeal mucosa was often inflamed. Ulceration of a tonsil was seen in one, and

ulcerated lesions of the palate in another case of the Rocky Mountain spotted fever type. Conjunctivitis was somewhat more common and more intense in endemic typhus. The spleen was enlarged and usually tender in 36 per cent of the Rocky Mountain spotted fever type cases; it was palpable in two and tender in one of the endemic typhus cases. Rigidity of the neck, with presence of Kernig's sign, was noted in 20 per cent of the Rocky Mountain spotted fever type cases, but in only one case of endemic typhus. Bronchitis was present in a few cases in each group. In the endemic typhus group the pulse was as a rule remarkably slow, even in cases with high temperatures, e. g. 100 with 105.2° F.; 96 with 105° F.; 110 with 104.2° F.; 80 with 103° F.; 86 with 103° F.; 100 with 104° F.; 84 with 104° F. The pulse tended to be higher, in ratio to the temperature, in the Rocky Mountain spotted fever type cases; this was not, however, a constant feature, as many cases had a rather slow pulse throughout. In the severest cases, and particularly in those that terminated fatally, the pulse was usually quite high, ranging from 130 to 160.

General symptoms.—The commonest symptoms at the height of the disease were, in order of frequency as follows: Prostration; headache, usually frontal; constipation; nausea and vomiting (more frequent in the Rocky Mountain spotted fever type); low backache and leg pains; unproductive cough. In the Rocky Mountain spotted fever type, pain in the back of the neck and abdominal pain were not uncommon; in endemic typhus these symptoms were rare. Photophobia and sore throat were more frequent in cases of endemic typhus. Sweats were not uncommon in both conditions. Rare symptoms were epistaxis and dysuria.

Nervous and mental.—Disturbances of the central nervous system were more severe in the Rocky Mountain spotted fever type. In both types of disease, lethargy, often associated or alternating with insomnia, restlessness, or irritability, was present in nearly all cases. Actual stupor was more frequent in the Rocky Mountain spotted fever type, and coma was present exclusively in this group. Meningismus was frequent in the Rocky Mountain spotted fever type. In severe cases of the latter there was loss of sphincter control. Hyperesthesia and tremors were occasionally noted in this disease. While a number of endemic typhus cases at some time had delirium, this was never as common, as protracted, nor as violent as that occurring in the Rocky Mountain spotted fever type.

Laboratory findings.—In most of the cases of endemic typhus, the total leucocyte count was within normal limits or there was a moderate leucopenia. In a few cases there was a low grade leucocytosis. In the Rocky Mountain spotted fever type of cases there was in most instances a definite leucocytosis. The urine contained a trace of albumin at some stage of the disease in many of the cases in both

groups. Rarely, granular or hyaline casts were found. The blood serum agglutinated *B. proteus* X_{19} in a dilution of 1:80, or more, at some stage of the disease, or after recovery, in nearly all cases of both series. Of two Rocky Mountain spotted fever type cases that recovered, one never showed a higher titer than 1:40, and the other did not at any time agglutinate the strain of X_{19} routinely used.

Complications and sequelæ.—There were no complications in our endemic typhus series. Convalescence was, as a rule, speedy. Occasionally a torpor or slight disorientation persisted for several days. In the Rocky Mountain spotted fever type of disease, convalescence was usually more protracted. There were noted in four instances a marked deafness; in three, visual disturbances; and in two, slurring speech, with slow restoration to normal. In several cases the mental confusion persisted for weeks.

Fatality.—There were no deaths in the endemic typhus group. The Rocky Mountain spotted fever type group includes seven fatal cases—death occurring on the ninth day in three instances, and on the sixth, twelfth, thirteenth, and sixteenth days in one instance each. Of 93 cases of the Rocky Mountain spotted fever type occurring in five States and in the District of Columbia in the spring and summer of 1930, 21 died—a case fatality rate of 22.6 per cent.

EPIDEMIOLOGICAL CHARACTERISTICS

Geographic distribution.—The cases comprising the endemic typhus group occurred in Baltimore, Savannah, Tampa, and in smaller urban communities in Georgia and Florida. The Rocky Mountain spotted fever type group is composed of cases that occurred, or originated, in rural communities in Delaware, Maryland, Pennsylvania, Virginia, North Carolina, and the District of Columbia. The geographic boundaries of the two diseases are not known.

Seasonal distribution.—It is generally recognized that New World endemic typhus attains its maximum prevalence in the summer and fall. The earliest case of the Rocky Mountain spotted fever type observed by us had its onset on April 7. The cases were distributed as follows: 2 in April, 7 in May, 14 in June, 19 in July, 6 in August, 1 in September (onset, September 3), and 1 in December (onset, December 9).

Race.—All of the endemic typhus cases were in white persons, with one exception, a negro. Three of the Rocky Mountain spotted fever type cases were in negroes; the remainder were in white persons.

Sex.—There was a preponderance of males in both diseases.

Age.—The bulk of the endemic typhus cases occurred in the middle age groups. The Rocky Mountain spotted fever type, however, attacked a larger proportion of children.

Incidence.—For the most part, cases of endemic typhus were sporadic. In several instances, however, multiple cases were traceable to a single source or focus of infection. For example, in one of these, three employees of a small establishment came down with the disease during the year, the dates of onset being September 1, September 20, and October 10. In 1929, three other cases had occurred at the same place, the dates of onset being August 21, September 2, and September 27. The basement of this building was heavily infested with *Rattus norvegicus.* Four of the patients had worked in the basement storeroom shortly before onset. These persons all lived under excellent sanitary conditions in different parts of the city. The Rocky Mountain spotted fever type of cases were mostly grouped in areas of 5 to 20 miles diameter. In all of these areas cases had also occurred in previous years.

Source of infection.—The following data are regarded as significant: 78 per cent of the endemic typhus cases had occurred in close association with rats, although in only 16 per cent of these had there been actual contact with rats. Eight per cent had knowledge of having been bitten by fleas within a short time preceding onset. Bites by bedbugs and by insects of undetermined type totaled 6 per cent each. One patient was infested with lice. Live rats and nests obtained from four premises at which cases had occurred were found to be infested with the fleas *Xenopsylla cheopis*, and *Ceratophyllus fasciatus*, and the rat mite *Laelaps echidninus.* The last named is not known to attack man.

In the Rocky Mountain spotted fever type group, a definite history of tick bite within three weeks prior to onset was elicited in 48 per cent of cases. In 6 per cent of cases, patients had crushed engorged ticks removed from dogs. The remainder had all occurred under conditions in which tick bite was possible. Bites by chiggers, bedbugs, and unidentified insects or arachnids totaled 16 per cent; of which half also gave a history of tick bite. In 15 per cent of the uninfected members of the households in which cases had occurred, tick bites had been noted in the 1930 season up to the time of investigation of each case. Of this group, 13 per cent had been bitten by chiggers or bedbugs. The seasonal distribution of cases of this disease corresponded quite well with the duration of the tick season, and, roughly, with the relative prevalence of ticks. In three of the focal areas a systematic collection of ticks showed the predominant species to be *Dermacentor variabilis.* Occasionally, specimens of *Amblyomma maculatum* and *Amblyomma americanum* were obtained. Rodent infestation of premises was ascertained in seven cases. In one of these, 16 live rats and a nest were secured, which were found to be free of ectoparasites.

Incubation.—Probable incubation periods could be estimated in only seven cases of endemic typhus, and were as follows: 3 of 7 days, 1 of 8 days, 1 of 7 or 8 days, 1 of 10 days, and 1 of 11 days—these periods being reckoned from isolated contact with rats or from insect bite. In the Rocky Mountain spotted fever type the probable incubation was ascertainable in 22 cases, as follows: 8 of 3 days, 2 of 4 days, 2 of 5 days, 1 of 6 days, 3 of 7 days, 1 of 8 days, 2 of 10 days, 1 of 12 days, 2 of 14 days, reckoning from tick bite or the crushing of ticks.

Multiple cases in household.—In very few instances had any precautions been taken with patients to prevent spread to other persons. In the endemic typhus series there were no secondary cases in any family. In the Rocky Mountain spotted fever type group, there were three instances of the occurrence of multiple cases in a household. In one of these, three cases occurred, with intervals of 12 days and 7 weeks. In each of the other two there were two cases which came down within a week of each other.

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PSITTACOSIS INFECTION FROM LOVE BIRDS

Five cases of a disease believed to be psittacosis, with one death, were recently brought to the attention of the health authorities in Brooklyn, N. Y. All of the cases were in related persons who had had contact with love birds brought from Habana, Cuba, on December 31, 1930. Several of the birds died after arrival in this country.

A man who had cared for two of the birds fell sick of what was at first diagnosed as pneumonia on January 13, and died 5 days later. Shortly afterwards four women, all related to the dead man, and who had been exposed to the birds and in close contact with each other, became ill. While the clinical picture of these cases was strongly suggestive of an infection of influenza with bronchial pneumonia complication, it is believed on later clinical and epidemiological evidence that the love birds were the original source of infection, and that the disease is the same as that caused by infected parrots during the winter of 1929–30.

THE PREVALENCE OF INFLUENZA

United States.—For the week ended February 14, 1931, 11,802 cases of influenza were reported to the Public Health Service (see pp. 487 and 488), as compared with 10,068 cases for the week ended February 7, and 12,828 cases for the week ended January 31, 1931.

The disease has passed the peak and is decreasing in Massachusetts, New York City, New Jersey, Maryland, North Carolina, and Illinois. In some other States it is probable that the peak has been reached.

Increased prevalence of influenza was shown by the reports for the week ended February 14, 1931, in New Hampshire, Connecticut, Ohio, Michigan, Missouri, South Carolina, Tennessee, Alabama, Arkansas, several of the Rocky Mountain States, and California.

The disease is very mild, and it is evident that the reported cases of influenza include only a small percentage of the cases of minor respiratory diseases which exist.

Europe.—In Norway influenza was spreading during the latter part of January. In Switzerland 6,862 cases of influenza were reported during the week ended January 31, 1931, as compared with 1,440 and 4,786 cases, respectively, for the preceding two weeks. The latest report from the Netherlands indicated that influenza was not epidemic in that country.

A report dated February 7, 1931, stated that in Scotland the number of deaths from influenza and other respiratory diseases was normal for the season. In Northern Ireland influenza had occurred in a few districts but not in real epidemic form. In the Irish Free State influenza was prevailing in Kilkenny, in Cork, and about Dublin.

The outbreak in Liverpool was said to be declining during the first week of February. The general death rate in 107 great towns of England and Wales during four weeks of January, 1931, was as follows:

Week ended—	Deaths per 1,000 population
Jan. 10, 1931	17.1
Jan. 17, 1931	17.2
Jan. 24, 1931	16.6
Jan. 31, 1931	16.0

COURT DECISION RELATING TO PUBLIC HEALTH

City charter amendment held to impair obligation of contract whereby city granted exclusive right to collect and haul garbage.—(Oregon Supreme Court; Elliott et al. *v.* City of Eugene et al., 294 P. 358; decided Dec. 23, 1930.) The city of Eugene, by ordinance, provided that a contract should be executed granting to Bray Bros. for a period of 3

years the privilege of collecting all garbage in the city according to the terms of a contract attached to the ordinance. Among other things, the ordinance made it unlawful for any person, firm, or corporation to haul garbage, rubbish, or refuse for hire unless a contract had first been entered into with the city for such service, it being the intention to make the attached contract with Bray Bros. an exclusive contract. A penalty was prescribed for violation of the ordinance. A contract was entered into between the city and Bray Bros., and by it the city granted to Bray Bros. "the exclusive right, franchise, and privilege of collecting, gathering, and hauling over the streets of the city * * * all garbage * * * with the right to exact charges * * * for the term of three years from and after April 1, 1928." Later the hauling of garbage for hire, mentioned in the ordinance, was more particularly defined by another ordinance providing that "any person, firm or corporation hauling garbage, refuse, or rubbish not produced by himself shall be deemed to be hauling for hire." Still later the charter of the city was amended by the addition of the following:

SECTION 1. That the city of Eugene, Oregon, never shall grant to any person, firm, or corporation a monopoly to haul garbage, rubbish or refuse within the city of Eugene, Oregon, or along or over the streets of the said city for hire, or otherwise, and that all citizens of the said city shall have the right to remove garbage, rubbish and refuse from the said city for hire or otherwise; and that any resident of the said city shall have the right to employ such person as he may desire to haul his garbage, rubbish, or refuse.

SEC. 2. That the common council shall have the power to enact reasonable measures for the sanitary removal of garbage, rubbish, and refuse; but the said measures shall apply to all alike.

SEC. 3. That all parts of the charter and ordinances of the said city which conflict with this act are hereby repealed.

The plaintiffs kept some livestock on their farms outside the city and purchased garbage which accumulated in the city and hauled it from where produced to their farms. They alleged that the defendant city officials had threatened to arrest them because of such collection and hauling of garbage and prayed for an order restraining such officials from so doing. The trial court rendered a decree in favor of defendants, which on appeal was affirmed by the supreme court. The latter court held that an exclusive franchise had been conferred by the ordinances upon Bray Bros. and that this franchise was protected by the provision of the Federal Constitution which prohibited legislation "impairing the obligation of contracts." It was held that the charter amendment did not repeal the two ordinances involved, but the court stated that "we find no occasion for withholding legal significance to the charter amendment at the conclusion of the Bray Bros. contract."

DEATHS FROM INFLUENZA AND PNEUMONIA IN LARGE CITIES

Deaths from influenza and pneumonia (all forms) in certain large cities of the United States during the three weeks ended February 7, 1931. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

City	Influenza				Pneumonia			
	Total	Feb. 7	Jan. 31	Jan. 24	Total	Feb. 7	Jan. 31	Jan. 24
Total	1,111	382	415	314	4,798	1,522	1,747	1,529
Akron	1	1	0	0	21	6	7	8
Albany	4	3	1	0	16	9	6	1
Atlanta	2	2	0	0	35	10	15	10
Baltimore	55	26	19	10	161	57	66	38
Birmingham	10	3	3	4	34	5	13	16
Boston	12	4	5	3	141	59	41	41
Bridgeport	6	4	2	0	16	5	9	2
Buffalo	2	1	1	0	76	24	30	22
Cambridge	3	1	1	1	18	9	5	4
Camden	17	7	7	3	25	9	11	5
Canton	2	1	1	0	8	3	3	2
Chicago	116	59	38	19	421	153	173	95
Cincinnati	9	6	1	2	44	10	18	16
Cleveland	7	0	4	3	50	19	12	19
Columbus	10	3	6	1	20	8	6	6
Dallas	10	2	6	2	33	12	8	13
Dayton	4	0	2	2	18	6	4	8
Denver	11	4	2	5	40	16	13	11
Des Moines	0	0	0	0	12	3	4	5
Detroit	10	7	2	1	86	34	33	19
Duluth	5	4	1	0	5	2	1	2
El Paso	7	2	2	3	30	10	9	11
Erie	0	0	0	0	7	0	2	5
Fall River	1	1	0	0	8	5	1	2
Flint	1	1	0	0	8	3	2	3
Fort Worth	0	0	0	0	15	3	6	6
Grand Rapids	0	0	0	0	6	3	1	2
Houston	5	2	0	3	18	2	6	10
Indianapolis	10	5	3	2	47	20	12	15
Jersey City	11	4	3	4	80	13	38	29
Kansas City, Kans	4	3	0	1	27	9	7	11
Kansas City, Mo	4	3	0	1	52	17	14	21
Knoxville	6	2	3	1	13	1	6	6
Long Beach	0	0	0	0	6	1	4	1
Los Angeles	3	1	2	0	74	18	30	26
Louisville	6	4	2	0	65	14	27	24
Lowell	3	1	1	1	11	3	4	4
Lynn	0	0	0	0	12	5	4	3
Memphis	11	3	5	3	36	11	9	16
Miami	0	0	0	0	3	2	1	0
Milwaukee	6	2	4	0	50	16	20	14
Minneapolis	4	1	1	2	32	10	8	14
Nashville	4	0	4	0	25	9	8	8
New Bedford	1	0	1	0	7	2	0	5
New Haven	5	3	2	0	19	5	10	4
New Orleans	41	12	17	12	66	25	15	26
New York	373	84	112	147	1,405	362	535	508
Newark, N. J	13	2	4	7	95	43	32	20
Oakland	1	1	0	0	17	5	8	4
Oklahoma City	2	1	1	0	32	12	12	8
Omaha	0	0	0	0	24	6	9	9
Paterson	6	4	2	0	25	6	13	6
Philadelphia	151	46	61	44	407	138	141	128
Pittsburgh	19	8	9	2	155	51	58	46
Portland, Oreg	2	1	1	0	14	5	0	9
Providence	6	5	1	0	21	9	5	7
Richmond	13	8	5	0	31	13	9	9
Rochester	2	0	1	1	20	6	7	7
St. Louis	6	5	1	0	105	42	28	35
St. Paul	6	2	1	3	15	2	9	4
Salt Lake City	2	0	2	0	12	4	6	2
San Antonio	18	5	5	8	34	7	15	12
San Diego	0	0	0	0	16	4	6	6
San Francisco	9	2	4	3	26	6	12	8
Schenectady	2	0	1	1	8	4	2	2
Seattle	3	1	0	2	11	3	2	6
Somerville	0	0	0	0	11	3	7	1
South Bend	0	0	0	0	10	1	3	6
Spokane	1	0	1	0	7	0	5	2

Deaths from influenza and pneumonia (all forms) in certain large cities of the United States during the three weeks ended February 7, 1931—Continued.

City	Influenza				Pneumonia			
	Total	Feb. 7	Jan. 31	Jan. 24	Total	Feb. 7	Jan. 31	Jan. 24
Springfield, Mass	1	0	1	0	24	12	6	6
Syracuse	1	0	1	0	13	3	5	5
Tacoma	1	0	0	1	5	1	2	2
Toledo	3	2	0	1	12	1	7	4
Trenton	5	3	1	1	17	11	4	2
Utica	1	1	0	0	14	4	4	6
Washington, D. C	25	11	12	2	89	31	32	26
Waterbury	4	2	1	1	19	9	5	5
Wilmington, Del	2	0	2	0	22	9	7	6
Worcester	3	0	2	1	50	26	17	7
Yonkers	1	0	1	0	20	10	6	4
Youngstown	0	0	0	0	15	7	6	2

DEATHS DURING WEEK ENDED FEBRUARY 7, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended February 7, 1931, and corresponding week of 1930. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce

	Week ended February 7, 1931	Corresponding week, 1930
Policies in force	75, 182, 838	75, 453, 060
Number of death claims	16, 511	15, 087
Death claims per 1,000 policies in force, annual rate	11. 5	10. 4

Deaths [1] from all causes in certain large cities of the United States during the week ended February 7, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Feb. 7, 1931				Corresponding week, 1930		Death rate [2] for first 6 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (81 cities)	9, 792	14. 3	857	[4] 68	13. 7	852	14. 2	13. 2
Akron	48	9. 7	7	69	10 0	12	8. 3	8. 9
Albany [5]	34	13. 7	3	50	19. 6	4	14. 1	16 5
Atlanta	75	14. 1	13	133	18. 0	9	16. 5	17. 0
White	47		9	143		5		
Colored	28	(6)	4	115	(6)	4	(6)	(6)
Baltimore [5]	339	21. 7	24	81	16. 7	16	17. 6	15. 4
White	272		15	65		11		
Colored	67	(6)	9	141	(6)	5	(6)	(6)
Birmingham	72	13. 9	9	91	16. 9	10	15. 1	14. 5
White	33		5	86		5		
Colored	39	(6)	4	97	(6)	5	(6)	(6)
Boston	278	18. 5	23	66	15. 5	24	17. 5	15. 4
Bridgeport	41	14. 5	4	66	18. 8	4	14. 4	14. 3
Buffalo	175	15. 7	14	57	14. 6	12	14. 5	14. 2
Cambridge	37	16. 9	2	40	11. 5	3	14. 4	13. 9
Camden	50	21. 9	3	52	17. 1	2	19. 1	14. 9
Canton	24	11. 7	1	23	7. 9	1	10. 5	11. 8
Chicago [5]	962	14. 5	82	72	12. 1	69	12. 4	11. 6
Cincinnati	158	18. 0	18	78	20. 4	16	17. 9	17. 5
Cleveland	205	11. 7	17	49	13. 1	23	11. 1	12. 2

Footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended February 7, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

City	Week ended Feb. 7, 1931				Corresponding week, 1930		Death rate [2] for first 6 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Columbus	90	15.9	12	117	15.0	10	14.2	15.2
Dallas	54	10.4	3		14.7	8	12.7	14.0
White	32		2			7		
Colored	22	(6)	1		(6)	1	(6)	(6)
Dayton	45	11.3	5	70	11.6	3	13.1	10.6
Denver	91	16.3	7	68	20.2	11	16.2	15.5
Des Moines	24	8.7	1	18	17.5	1	12.6	13.9
Detroit	313	9.9	42	67	11.5	52	8.6	10.2
Duluth	21	10.8	2	49	11.8	2	12.4	11.9
El Paso	39	19.4	11		13.7	3	22.2	19.7
Erie	18	8.0	5	93	10.3	0	10.6	11.8
Fall River [5] [7]	26	11.8	0	0	14.5	2	12.7	13.0
Flint	18	5.7	3	38	10.2	6	7.9	9.6
Fort Worth	31	9.7	1		14.0	7	12.5	13.2
White	26		1			4		
Colored	5	(6)	0		(6)	3	(6)	(6)
Grand Rapids	43	13.1	3	44	8.3	2	9.9	10.3
Houston	58	9.8	4		12.9	11	12.2	13.4
White	40		1			9		
Colored	18	(6)	3		(6)	2	(6)	(6)
Indianapolis	118	10.6	5	41	17.0	9	14.7	16.9
White	100		4	38		9		
Colored	18	(6)	1	67	(6)	0	(6)	(6)
Jersey City	93	15.2	13	115	12.0	17	14.7	12.4
Kansas City, Kans	45	19.1	3	62	13.7	4	15.8	13.2
White	35		2	49		4		
Colored	10	(6)	1	127	(6)	0	(6)	(6)
Kansas City, Mo	114	14.5	16	121	15.6	11	14.7	14.2
Knoxville	22	10.5	3	64	16.2	1	14.4	14.3
White	20		3	71		1		
Colored	2	(6)	0	0	(6)	0	(6)	(6)
Long Beach	36	12.3	1	24	9.4	1	11.3	11.7
Los Angeles	262	10.4	21	61	12.8	24	13.1	12.9
Louisville	82	13.9	6	51	14.2	8	17.9	14.7
White	64		6	59		6		
Colored	18	(6)	0	0	(6)	2	(6)	(6)
Lowell [7]	29	15.0	3	76	17.1	3	15.3	14.5
Lynn	21	10.7	2	52	16.3	3	13.7	12.2
Memphis	87	17.5	9	95	19.1	9	18.5	16.8
White	48		4	67		5		
Colored	39	(6)	5	145	(6)	4	(6)	(6)
Miami	34	15.8	1	25	15.5	4	13.8	12.8
White	23		1	35		2		
Colored	11	(6)	0	0	(6)	2	(6)	(6)
Milwaukee	118	10.4	19	82	11.4	19	10.0	10.6
Minneapolis	119	13.1	14	90	11.4	6	12.5	12.1
Nashville	47	15.8	6	89	15.6	10	17.0	17.3
White	34		6	120		8		
Colored	13	(6)	0	0	(6)	2	(6)	(6)
New Bedford [7]	30	13.9	4	106	12.5	4	13.2	11.7
New Haven	43	13.8	3	57	19.9	2	13.4	15.4
New Orleans	182	20.3	18	99	19.4	20	21.4	20.6
White	100		6	50		13		
Colored	82	(6)	12	196	(6)	7	(6)	(6)
New York	1,857	13.7	170	71	12.4	155	14.8	11.9
Bronx Borough	248	9.7	15	34	8.9	24	10.6	8.4
Brooklyn Borough	629	12.5	70	74	11.4	53	13.9	11.0
Manhattan Borough	720	20.7	61	104	18.4	60	22.1	17.8
Queens Borough	215	9.7	18	49	7.8	16	10.0	7.8
Richmond Borough	45	14.4	6	108	18.3	2	14.8	14.6
Newark, N. J	153	17.9	10	52	15.3	9	14.7	14.2
Oakland	52	9.3	3	38	12.0	4	12.8	13.1
Oklahoma City	46	12.2	8	110	9.2	6	11.6	9.7
Omaha	62	14.9	4	45	11.7	3	15.5	14.6
Paterson	51	19.2	4	69	13.2	9	15.4	12.4
Philadelphia	679	18.0	54	78	13.6	42	17.0	13.3
Pittsburgh	214	16.5	28	97	16.7	22	16.8	15.0
Portland, Oreg	69	11.7	2	24	16.2	5	13.4	14.7
Providence	77	15.8	7	65	15.4	4	15.4	15.9

Footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended February 7, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

City	Week ended Feb. 7, 1931				Corresponding week, 1930		Death rate [2] for first 5 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Richmond	85	24.0	5	73	17.1	7	17.8	16.5
White	48		2	44		3		
Colored	37	(6)	3	130	(6)	4	(6)	(6)
Rochester	75	11.8	7	64	12.2	5	13.1	11.8
St. Louis	303	19.1	22	74	15.6	12	17.2	14.9
St. Paul	47	8.9	3	31	11.9	4	10.8	12.1
Salt Lake City [5]	38	13.9	3	45	12.6	4	13.9	14.5
San Antonio	71	15.4	8		16.8	8	16.2	20.6
San Diego	55	18.3	2	41	15.7	4	17.2	16.4
San Francisco	162	13.0	8	53	17.1	7	15.0	14.8
Schenectady	30	16.3	1	29	7.1	1	10.7	10.4
Seattle	78	10.9	1	9	15.2	7	12.8	11.9
Somerville	27	13.4	5	186	12.5	2	10.9	12.6
South Bend	13	6.3	1	25	8.4	2	7.5	9.4
Spokane	21	9.4	1	26	13.5	4	13.8	13.1
Springfield, Mass	48	16.4	3	46	18.0	4	14.1	14.7
Syracuse	52	12.7	5	59	13.7	2	13.3	13.8
Tacoma	30	14.5	0	0	15.1	2	15.0	11.7
Toledo	68	12.0	3	28	14.8	5	12.4	14.0
Trenton	56	23.6	2	35	16.0	3	20.3	17.2
Utica	30	15.3	2	52	14.3	2	16.6	15.6
Washington, D. C	188	19.9	9	50	15.5	7	18.7	16.2
White	121		4	33		4		
Colored	67	(6)	5	86	(6)	3	(6)	(6)
Waterbury	29	15.0	1	30	9.9	2	11.3	10.3
Wilmington, Del. [7]	36	17.6	3	65	13.7	2	15.7	15.1
Worcester	74	19.6	4	55	12.5	9	16.2	13.8
Yonkers	34	12.8	2	52	10.8	6	11.5	8.7
Youngstown	31	9.3	5	70	9.8	4	10.8	10.7

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Date for 76 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14, Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended February 14, 1931, and February 15, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended February 14, 1931, and February 15, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Feb 14, 1931	Week ended Feb 15, 1930	Week ended Feb 14, 1931	Week ended Feb 15, 1930	Week ended Feb 14, 1931	Week ended Feb 15, 1930	Week ended Feb 14, 1931	Week ended Feb. 15, 1930
New England States:								
Maine	8	2	64	12	13	46	1	0
New Hampshire		1	212	4	73	22	0	0
Vermont		3	1		23	7	0	0
Massachusetts	50	71	154	15	505	510	2	5
Rhode Island	13	15	21		1	3	0	0
Connecticut	12	25	261	6	269	20	2	0
Middle Atlantic States:								
New York	106	126	[1] 179	[1] 42	760	557	15	18
New Jersey	45	117	236	22	633	362	6	4
Pennsylvania	98	158			1,880	783	12	8
East North Central States:								
Ohio	62	78	509	36	348	760	8	11
Indiana	39	34	111		684	65	0	14
Illinois	147	158	288	44	970	627	10	11
Michigan	48	66	111	7	179	440	6	32
Wisconsin	18	31	137	66	363	1,184	0	8
West North Central States:								
Minnesota	10	11	13	4	54	161	0	4
Iowa	9	11		1	11	496	3	2
Missouri	37	37	151	38	969	76	6	21
North Dakota	11	6			12	46	3	1
South Dakota	3	3	1		15	119	2	2
Nebraska	18	19	14	23	4	723	3	3
Kansas	9	19	22	5	18	342	2	6
South Atlantic States:								
Delaware	1		29		7	6	0	0
Maryland [2]	21	25	1,040	54	433	11	8	0
District of Columbia	6	18	15	1	48	9	0	0
Virginia								1
West Virginia	9	12	134	12	91	99	0	4
North Carolina	35	36	312	37	278	15	7	0
South Carolina	16	16	3,742	1,061	140		8	8
Georgia [3]	10	16	1,933	234	132	335	4	16
Florida	9	13	229	3	145	102	2	3
East South Central States:								
Kentucky					189	132	3	1
Tennessee	9	3	367	163	174	202	1	21
Alabama [3]	15	43	332	176	411	108	7	3
Mississippi	16	21					4	26

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, 1931, 2 cases: 1 case in Georgia and 1 case in Alabama.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended February 14, 1931, and February 15, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Feb. 14, 1931	Week ended Feb. 15, 1930	Week ended Feb. 14, 1931	Week ended Feb. 15, 1930	Week ended Feb. 14 1931	Week ended Feb. 15, 1930	Week ended Feb. 14, 1931	Week ended Feb. 15, 1930
West South Central States:								
Arkansas	21	5	223	206	3	5	2	4
Louisiana	21	16	189	27	3	90	2	5
Oklahoma [4]	34	24	257	131	26	267	0	5
Texas	45	41	51	55	91	120	1	2
Mountain States:								
Montana	3	1	10		1	21	0	1
Idaho		2	3		6	81	1	2
Wyoming	2	1			2	33	1	0
Colorado	9	8			205	65	2	0
New Mexico	4	6	83		22	56	1	3
Arizona	6	7	18	12	173	5	3	5
Utah [2]	1	2	18	1		232	1	3
Pacific States:								
Washington	9	8		4	50	209	0	7
Oregon	12	9	32	106	63	12	0	2
California	54	70	300	72	809	954	8	9

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Feb. 14, 1931	Week ended Feb. 15, 1930	Week ended Feb. 14, 1931	Week ended Feb. 15, 1930	Week ended Feb. 14, 1931	Week ended Feb. 15, 1930	Week ended Feb. 14, 1931	Week ended Feb. 15, 1930
New England States:								
Maine	0	0	38	45	0	0	2	9
New Hampshire	0	0	3	22	0	0	0	5
Vermont	0	0	12	7	0	4	0	0
Massachusetts	1	0	378	302	0	0	2	0
Rhode Island	0	0	31	31	0	0	0	0
Connecticut	0	1	73	127	0	0	0	1
Middle Atlantic States:								
New York	4	3	768	478	10	7	6	31
New Jersey	0	0	280	275	0	0	2	3
Pennsylvania	2	0	550	487	0	3	7	13
East North Central States:								
Ohio	2	0	704	379	64	170	8	7
Indiana	0	0	306	183	82	173	2	3
Illinois	3	1	481	607	42	137	3	8
Michigan	2	0	366	335	31	93	5	3
Wisconsin	0	1	133	140	7	9	2	4
West North Central States:								
Minnesota	1	0	95	126	13	6	0	2
Iowa	0	0	136	107	64	67	0	0
Missouri	0	0	253	117	73	95	1	5
North Dakota	0	1	23	41	25	27	3	0
South Dakota	1	0	13	32	26	129	0	1
Nebraska	0	0	55	59	54	74	0	1
Kansas	0	1	71	120	77	72	2	0
South Atlantic States:								
Delaware	0	0	21	16	0	0	0	0
Maryland [2]	0	1	113	95	0	0	1	5
District of Columbia	0	1	25	22	0	0	0	0
Virginia		1						
West Virginia	1	0	30	57	8	56	1	7
North Carolina	1	2	77	62	1	14	3	7
South Carolina	1	0	12	6	3	2	2	1
Georgia [3]	0	0	62	34	0	0	1	2
Florida	0	0	9	9	0	4	5	4
East South Central States:								
Kentucky	1	0	97	86	9	15	3	2
Tennessee	0	2	47	32	5	15	3	3
Alabama [2]	0	2	35	25	2	0	3	10
Mississippi	0	1	22	16	10	1	8	1

[2] Week ended Friday.
[3] Typhus fever, 1931, 2 cases: 1 case in Georgia and 1 case in Alabama.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended February 14, 1931, and February 15, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Feb. 14, 1931	Week ended Feb. 15, 1930	Week ended Feb. 14, 1931	Week ended Feb. 15, 1930	Week ended Feb. 14, 1931	Week ended Feb. 15, 1930	Week ended Feb. 14, 1931	Week ended Feb. 15, 1930
West South Central States:								
Arkansas	1	1	28	32	25	27	6	5
Louisiana	1	0	27	14	57	9	7	11
Oklahoma [4]	1	1	28	68	73	117	5	13
Texas	0	0	46	57	60	43	8	1
Mountain States:								
Montana	0	0	56	43	1	18	0	0
Idaho	0	0	12	10	0	17	4	0
Wyoming	0	0	38	3	2	7	0	0
Colorado	0	0	47	23	7	34	1	0
New Mexico	0	2	5	19	1	1	0	2
Arizona	0	0	3	10	3	19	0	0
Utah [1]	0	0	13	8	0	2	1	0
Pacific States								
Washington	1	1	46	73	30	59	2	4
Oregon	0	0	26	31	22	16	1	2
California	6	1	149	271	50	73	12	11

[1] Week ended Friday.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
January, 1931										
Delaware		17	87		22		0	135	0	0
District of Columbia	5	51	91		85		1	140	0	5
Indiana	53	257	169		1,253		4	1,559	495	7
Iowa	12	46			16		7	541	216	2
Massachusetts	10	337	458		2,183		9	1,413	6	16
South Carolina		230	7,422	556	97	215	3	82	4	25
Tennessee	48	105	1,173	16	712	9	2	428	43	40
Vermont		9			107		0	33	17	1

January, 1931

	Cases
Anthrax:	
Delaware	2
Chicken pox:	
Delaware	39
District of Columbia	187
Indiana	676
Iowa	324
Massachusetts	1,897
South Carolina	306
Tennessee	456
Vermont	240
Dengue:	
South Carolina	9
Diarrhea:	
South Carolina	271
Dysentery:	
Massachusetts	2
German measles:	
Iowa	2
Massachusetts	143
South Carolina	1
Hookworm disease:	
South Carolina	90
Impetigo contagiosa.	
Tennessee	6
Lead poisoning	
Massachusetts	3
Lethargic encephalitis:	
Iowa	1
Massachusetts	9
Mumps:	
Delaware	11
Indiana	62
Iowa	60
Massachusetts	453

	Cases
Mumps—Continued.	
South Carolina	113
Tennessee	133
Vermont	68
Ophthalmia neonatorum:	
Delaware	1
Massachusetts	154
South Carolina	18
Paratyphoid fever:	
South Carolina	4
Puerperal septicemia:	
Tennessee	3
Rabies in animals:	
Delaware	3
South Carolina	18
Septic sore throat:	
Indiana	6
Iowa	2
Massachusetts	26
Tennessee	6
Tetanus:	
Indiana	1
Massachusetts	1
Tennessee	1
Trachoma:	
Massachusetts	4
Tennessee	3

	Cases
Tularaemia:	
Indiana	8
South Carolina	2
Tennessee	10
Typhus fever:	
South Carolina	1
Undulant fever:	
Indiana	3
Iowa	10
Massachusetts	2
Vermont	1
Vincent's angina:	
Iowa	2
Tennessee	6
Whooping cough:	
Delaware	25
District of Columbia	40
Indiana	236
Iowa	75
Massachusetts	805
South Carolina	149
Tennessee	108
Vermont	93

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,150,000. The estimated population of the 89 cities reporting deaths is more than 31,605,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended February 7, 1931, and February 8, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,263	1,409	
96 cities	499	578	928
Measles:			
45 States	10,172	9,028	
96 cities	3,027	1,979	
Meningococcus meningitis:			
47 States	134	254	
96 cities	59	112	
Poliomyelitis:			
46 States	28	17	
Scarlet fever:			
46 States	5,708	5,551	
96 cities	2,043	2,016	1,527
Smallpox:			
46 States	1,356	1,927	
96 cities	148	180	55
Typhoid fever:			
46 States	169	162	
96 cities	25	27	31
Deaths reported			
Influenza and pneumonia:			
89 cities	1,778	1,120	
Smallpox:			
89 cities	1	0	
Indianapolis, Ind	1	0	

City reports for week ended February 7, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	14	1	0	20	0	1	8	1
New Hampshire.								
Concord	0	0	0		0	1	0	0
Nashua	0	0	0		0	0	0	0
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	1	0	1		0	0	0	0
Massachusetts.								
Boston	59	36	18	102	4	64	15	59
Fall River	6	4	3	2	1	1	4	5
Springfield	9	4	2	2	1	2	11	2
Worcester	9	4	5	1	0	6	0	26
Rhode Island:								
Pawtucket	7	1	1		0	2	1	1
Providence	5	9	5		5	21	0	9
Connecticut:								
Bridgeport	0	6	0	14	4	2	3	5
Hartford	4	7	1	23	1	75	0	6
New Haven	25	1	0	10	3	34	16	5
MIDDLE ATLANTIC								
New York:								
Buffalo	31	13	8	7	1	77	47	24
New York	171	201	72	226	84	280	43	362
Rochester	5	8	3	1	0	4	5	6
Syracuse	29	2	1		0	7	0	3
New Jersey:								
Camden	15	6	2	6	7	136	13	9
Newark	63	19	10	59	2	2	8	44
Trenton	8	2	0	75	3	0	0	11
Pennsylvania								
Philadelphia	132	68	18	111	46	126	29	138
Pittsburgh	82	23	3	65	[illegible]	58	13	51
Reading	3	2	1		0	90	47	8
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	6	9	4	4	6	71	35	10
Cleveland	147	34	10	142	0	1	112	19
Columbus	11	8	3	4	3	2	1	8
Toledo	48	5	5	2	2	1	23	1
Indiana:								
Fort Wayne	5	4	9		0	35	0	8
Indianapolis	47	8	9		5	15	5	20
South Bend	1	1	0		0	0	0	1
Terre Haute	5	0	2		0	0	0	2
Illinois:								
Chicago	109	107	91	244	59	35	48	153
Springfield	9	1	0	3	0	59	1	6
Michigan:								
Detroit	88	49	24	107	7	11	19	38
Flint	13	3	0	3	1	2	7	3
Grand Rapids	9	2	1		0	1	1	3

City reports for week ended February 7, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—contd								
Wisconsin:								
Kenosha	21	1	0	21	2	0	26	1
Madison	10	0	1	...	...	1	28	...
Milwaukee	108	17	3	8	2	16	297	16
Racine	13	1	2	4	0	0	0	0
Superior	10	0	0	...	0	1	0	1
WEST NORTH CENTRAL								
Minnesota:								
Duluth	11	1	0	4	4	0	0	2
Minneapolis	41	20	7	...	1	29	58	10
St Paul	...	6	...	...	...	...	...	...
Iowa:								
Davenport	2	1	0	...	...	0	0	...
Des Moines	4	2	1	...	...	1	0	...
Sioux City	11	1	0	...	...	1	3	...
Waterloo	2	1	1	...	...	1	0	...
Missouri:								
Kansas City	36	5	9	3	0	53	2	17
St. Joseph	5	1	5	...	0	0	0	0
St. Louis	21	42	26	47	5	690	12	...
North Dakota:								
Fargo	6	0	0	...	0	0	9	3
Grand Forks	0	0	5	...	...	0	3	...
South Dakota:								
Aberdeen	2	0	0	...	...	0	0	...
Sioux Falls	0	0	0	...	...	1	0	...
Nebraska:								
Omaha	17	6	2	...	0	0	7	6
Kansas:								
Topeka	12	2	0	2	0	1	5	2
Wichita	4	2	2	...	0	0	0	3
SOUTH ATLANTIC								
Delaware:								
Wilmington	4	2	0	...	0	1	2	9
Maryland:								
Baltimore	123	25	5	829	26	231	36	57
Cumberland	0	0	0	22	2	1	0	0
Frederick	0	0	2	...	0	1	2	1
District of Columbia:								
Washington	21	19	12	48	11	47	0	31
Virginia:								
Lynchburg	11	2	1	...	0	0	0	4
Norfolk	11	1	0	17	0	0	0	8
Richmond	1	5	4	16	7	191	0	14
Roanoke	12	1	2	...	1	2	0	1
West Virginia:								
Charleston	2	0	1	5	4	0	0	5
Wheeling	15	1	0	...	0	0	0	3
North Carolina:								
Raleigh	7	0	1	...	2	2	0	0
Wilmington	50	1	0	5	0	0	0	3
Winston-Salem	7	1	1	37	3	2	0	5
South Carolina:								
Charleston	6	1	1	323	2	66	1	8
Columbia	...	0	...	...	...	...	...	...
Greenville	1	0	0	...	0	0	0	0
Georgia:								
Atlanta	2	4	1	335	2	39	0	10
Brunswick	3	0	0	...	0	0	20	0
Savannah	0	1	4	56	4	0	3	3
Florida:								
Miami	5	2	1	5	0	2	0	2
Tampa	4	1	2	...	0	59	0	7

City reports for week ended February 7, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	1	1	1		0	0	1	2
Tennessee:								
Memphis	46	4	0		3	29	3	11
Nashville	1	0	0	2	2	12	1	9
Alabama:								
Birmingham	8	4	5	9	3	134	0	5
Mobile	1	0	2	26	2	1	0	1
Montgomery	17	2	1	10		0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	0			0	0	
Little Rock	0	1	0		0	0	0	2
Louisiana:								
New Orleans	0	14	25	18	12	0	0	25
Shreveport	9	2	0		0	0	0	6
Oklahoma:								
Muskogee	1	1	0	4	0	0	0	0
Tulsa	8	1	2			1	0	
Texas:								
Dallas	18	7	10	5	2	0	2	12
Fort Worth	10	4	[illegible]		0	0	0	3
Galveston	2	2	0		0	0	0	8
Houston	6	7	6		2	0	3	2
San Antonio	3	3	5		5	1	1	7
MOUNTAIN								
Montana:								
Billings	2	0	0		0	0	0	3
Great Falls	1	0	0		0	0	0	1
Helena	1	1	0		0	0	0	0
Missoula	0	0	0		0	0	0	0
Idaho:								
Boise	0	0	0		0	0	0	0
Colorado:								
Denver	51	9	9		4	8	24	15
Pueblo	6	1	0		2	119	2	0
New Mexico:								
Albuquerque	0	0	0		0	0	0	1
Arizona:								
Phoenix	0	1	2		0	2	1	1
Utah:								
Salt Lake City	6	3	0		0	2	3	4
Nevada:								
Reno	0	0	0	1	0	0	0	1
PACIFIC								
Washington:								
Seattle	25	4	3			2	24	
Spokane	8	3	0			11	0	
Tacoma	9	1	0		0	0	1	1
Oregon:								
Portland	28	8	1	2	1	14	13	5
Salem	0	0	0		0	20	19	0
California:								
Los Angeles	73	43	18	134	1	40	14	18
Sacramento	49	2	0	3	1	0	6	10
San Francisco	64	16	5	18	3	4	6	1

City reports for week ended February 7, 1931—**Continued**

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	4	14	0	0	0	0	1	0	0	11	13
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	9
Nashua	0	0	0	0	0	0	0	0	0	0	-------
Vermont:											
Barre	0	0	0	0	0	6	0	0	0	0	1
Burlington	0	0	1	0	0	0	0	0	0	0	8
Massachusetts:											
Boston	85	104	0	0	0	9	1	1	0	38	278
Fall River	4	18	0	0	0	3	1	0	0	3	28
Springfield	10	11	0	0	0	4	0	0	0	6	48
Worcester	10	24	0	0	0	0	1	0	0	3	74
Rhode Island:											
Pawtucket	2	16	0	0	0	0	0	0	0	2	18
Providence	13	23	0	0	0	7	1	0	0	4	77
Connecticut:											
Bridgeport	11	4	0	0	0	1	0	0	0	0	41
Hartford	7	6	0	0	0	0	0	0	0	0	52
New Haven	9	2	0	0	0	0	0	0	0	6	43
MIDDLE ATLANTIC											
New York:											
Buffalo	30	20	0	4	0	11	0	0	0	22	166
New York	275	301	0	0	0	104	7	1	0	175	1,857
Rochester	9	88	0	0	0	22	1	0	0	12	72
Syracuse	15	20	0	0	0	3	0	0	0	11	52
New Jersey:											
Camden	7	6	0	0	0	0	0	0	0	0	50
Newark	46	35	0	0	0	13	1	0	0	26	164
Trenton	6	9	0	0	0	3	0	0	0	2	56
Pennsylvania:											
Philadelphia	102	162	1	0	0	32	2	1	1	23	679
Pittsburgh	36	37	0	0	0	78	0	1	0	19	214
Reading	5	1	0	0	0	0	0	0	0	0	34
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	21	38	1	0	0	9	0	2	0	4	158
Cleveland	49	64	0	0	0	21	0	1	0	29	205
Columbus	12	10	0	1	0	3	0	0	0	0	90
Toledo	15	11	1	6	-------	4	1	0	0	6	68
Indiana:											
Fort Wayne	5	7	0	1	0	0	0	0	0	0	37
Indianapolis	11	58	5	17	1	2	0	0	0	23	-------
South Bend	4	0	0	0	0	0	0	0	0	6	13
Terre Haute	4	5	0	0	0	1	0	0	0	1	15
Illinois:											
Chicago	140	214	2	0	0	47	3	0	0	44	962
Springfield	3	2	0	0	0	0	0	0	0	0	21
Michigan:											
Detroit	118	78	2	0	0	49	1	0	0	91	313
Flint	16	12	1	0	0	1	0	0	0	14	18
Grand Rapids	13	16	0	0	0	0	0	0	0	6	43
Wisconsin:											
Kenosha	2	2	1	0	0	0	0	0	0	0	9
Madison	4	1	1	0	-------	-------	0	0	-------	1	-------
Milwaukee	39	32	0	0	0	32	0		1	30	118
Racine	5	5	0	0	0	1	0		0	10	14
Superior	3	2	0	0	0	1	0	0	0	0	11
WEST NORTH CENTRAL											
Minnesota:											
Duluth	12	0	0	0	0	0	0	0	0	1	21
Minneapolis	54	29	3	0	0	8	0	0	0	14	119
St. Paul	35	-------	1	-------	-------	-------	0	-------	-------	-------	-------
Iowa:											
Davenport	0	1	2	10	-------	-------	0	0	-------	0	-------
Des Moines	11	3	2	5	-------	-------	0	0	-------	0	24
Sioux City	2	19	0	0	-------	-------	0	0	-------	0	-------
Waterloo	3	0	0	1	-------	-------	0	0	-------	1	-------

City reports for week ended February 7, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—contd											
Missouri:											
Kansas City	19	14	1	1	0	8	0	1	0	2	114
St. Joseph	3	6	0	0	0	1	0	0	0	0	22
St. Louis	38	150	1	3	0	13	0	0	0	8	-------
North Dakota:											
Fargo	1	8	0	0	0	0	0	0	0	2	12
Grand Forks	1	1	1	0	-------	-------	0	0	-------	0	-------
South Dakota:											
Aberdeen	0	0	0	0	-------	-------	0	0	-------	0	-------
Sioux Falls	2	1	0	5	-------	-------	0	0	-------	0	7
Nebraska:											
Omaha	6	8	1	37	0	2	1	0	0	4	62
Kansas:											
Topeka	4	1	0	1	0	1	0	0	0	0	18
Wichita	10	8	0	36	0	0	0	0	0	1	-------
SOUTH ATLANTIC											
Delaware:											
Wilmington	5	7	0	0	0	2	0	0	0	3	36
Maryland:											
Baltimore	39	38	0	0	0	12	2	2	1	12	339
Cumberland	0	4	0	0	0	0	0	0	0	0	8
Frederick	1	0	0	0	0	0	0	0	0	0	5
District of Columbia:											
Washington	25	37	1	0	0	12	0	0	0	7	188
Virginia:											
Lynchburg	1	0	0	0	0	1	0	0	0	0	14
Norfolk	3	4	0	0	0	2	0	0	0	11	-------
Richmond	4	7	0	0	0	3	0	2	0	2	70
Roanoke	3	2	0	0	0	0	0	0	0	0	11
West Virginia:											
Charleston	1	1	0	0	0	0	0	0	0	3	31
Wheeling	2	0	0	0	0	0	0	0	0	0	21
North Carolina:											
Raleigh	1	0	0	0	0	1	0	0	0	22	8
Wilmington	0	2	0	0	0	0	0	0	0	0	11
Winston-Salem	1	2	1	0	0	1	0	0	0	0	35
South Carolina:											
Charleston	0	1	0	0	0	0	1	0	0	0	30
Columbia	0	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Greenville	0	1	0	0	0	0	0	0	0	0	-------
Georgia:											
Atlanta	5	43	2	0	0	4	0	2	0	1	75
Brunswick	0	0	0	0	0	0	0	0	0	0	3
Savannah	0	5	1	0	0	1	0	1	0	0	37
Florida:											
Miami	2	2	0	0	0	3	0	1	0	0	34
Tampa	1	2	0	0	0	0	1	2	0	0	32
EAST SOUTH CENTRAL											
Kentucky:											
Covington	3	21	0	0	0	1	0	0	0	2	17
Tennessee:											
Memphis	8	35	1	5	0	7	0	0	0	0	87
Nashville	2	7	0	0	0	1	0	0	0	3	47
Alabama:											
Birmingham	3	6	1	0	0	4	0	1	0	0	72
Mobile	1	2	1	0	0	1	0	0	0	0	21
Montgomery	0	1	0	0	-------	-------	0	0	-------	3	-------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	0	0	0	-------	-------	0	0	-------	0	-------
Little Rock	1	0	0	0	0	2	0	0	0	0	-------
Louisiana:											
New Orleans	8	12	1	5	0	20	8	5	1	1	182
Shreveport	1	6	0	2	0	1	0	0	0	0	28

City reports for week ended February 7, 1931—**Continued**

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL—contd.											
Oklahoma:											
Muskogee	1	0	3	0	0	0	0	0	0	0	
Tulsa	2	6	1	0			0	1		0	
Texas:											
Dallas	5	3	2	9	0	5	0	0	0	8	54
Fort Worth	3	5	1	1	0	5	0	1	1	0	31
Galveston	1	1	0	0	0	1	0	1	0	0	17
Houston	4	4	3	8	0	3	0	1	1	0	58
San Antonio	1	0	0	0	0	11	0	0	0	0	71
MOUNTAIN											
Montana:											
Billings	0	1	0	2	0	0	0	0	0	2	7
Great Falls	3	5	1	0	0	1	0	0	0	7	6
Helena	0	0	0	0	0	0	0	0	0	0	3
Missoula	1	0	0	0	0	0	0	0	0	10	5
Idaho.											
Boise	1	3	0	3	0	0	0	0	0	0	
Colorado:											
Denver	13	19	0	0	0	2	0	0	0	11	92
Pueblo	1	2	0	0	0	1	0	0	0	5	9
New Mexico:											
Albuquerque	1	0	0	0	0	1	0	0	0	0	8
Arizona:											
Phoenix	1	2	0	0	0	2	0	0	0	0	19
Utah:											
Salt Lake City	4	0	1	0	0	0	0	0	0	26	38
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	4
PACIFIC											
Washington:											
Seattle	12	16	3	3			1	0		27	
Spokane	7	9	7	3			0	0		0	
Tacoma	3	2	4	0	0	0	0	0	0	0	30
Oregon:											
Portland	6	2	13	23	0	3	1	0	0	1	69
Salem	0	0	1	0	0	0	0	0	0	0	
California:											
Los Angeles	44	38	4	6	0	22	2	0	0	15	262
Sacramento	2	2	1	0	0	0	0	0	0	12	33
San Francisco	26	7	1	0	0	11	1	0	0	33	174

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Massachusetts:									
Boston	3	0	3	0	0	0	0	1	0
Connecticut:									
Hartford	1	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
New York	12	6	6	1	0	0	1	0	0
Syracuse	0	0	2	1	0	0	0	0	0
Pennsylvania:									
Philadelphia	7	4	0	0	0	0	0	2	0
Pittsburgh	1	1	0	0	0	0	0	0	0

City reports for week ended February 7, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	1	0	0	0	0	0	0	0
Cleveland	5	2	0	0	0	0	0	0	0
Columbus	0	0	1	1	0	0	0	0	0
Indiana:									
Indianapolis	0	1	0	0	0	0	0	0	0
Illinois:									
Chicago	10	6	2	0	0	0	0	1	0
Michigan:									
Detroit	2	0	4	0	0	0	0	0	0
Wisconsin:									
Milwaukee	0	1	0	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	1	0	0	0	0	0	0	0	0
Missouri:									
Kansas City	0	0	1	0	0	0	1	0	0
St. Louis	3	1	0	0	0	0	0	0	0
SOUTH ATLANTIC [1]									
Maryland:									
Baltimore	0	1	0	0	0	0	1	0	0
District of Columbia:									
Washington	0	2	0	0	0	0	0	0	0
Virginia:									
Richmond	0	1	0	0	0	0	0	0	0
Georgia:									
Atlanta	1	1	0	0	0	0	0	0	0
Brunswick	0	0	0	0	0	1	0	0	0
Savannah	0	0	0	0	2	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis [2]	4	4	0	0	0	0	0	0	0
Alabama:									
Birmingham	1	2	1	0	0	0	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	1	0	0	0
Louisiana:									
New Orleans	1	1	0	0	0	0	0	0	0
Shreveport	0	0	0	0	0	1	0	0	0
Texas.									
Galveston	0	1	0	0	0	0	0	0	0
MOUNTAIN									
Colorado:									
Denver	2	0	0	0	0	0	0	0	0
Arizona:									
Phoenix	0	1	0	0	0	0	0	0	0
Utah:									
Salt Lake City	0	1	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Seattle	1	0	0	0	0	0	0	0	0
Oregon:									
Portland	1	0	0	0	0	0	0	1	0
California:									
Los Angeles	3	3	0	0	0	0	0	0	0
San Francisco	0	0	0	0	0	0	0	2	1

[1] Dengue: 6 cases at Charleston, S. C.
[2] Typhus fever: 1 case at Memphis, Tenn.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended February 7, 1931, compared with those for a like period ended February 8, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities January 4 to February 7, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930	Jan. 31, 1931	Feb. 1, 1930	Feb. 7, 1931	Feb. 8, 1930
98 cities	81	115	74	108	[2] 79	110	[3] 89	112	[4] 78	92
New England	79	169	91	133	106	160	106	135	82	119
Middle Atlantic	63	107	56	89	67	91	68	98	53	92
East North Central	97	130	95	126	[5] 94	144	[6] 111	139	96	102
West North Central	98	126	82	110	84	83	111	77	[7] 111	83
South Atlantic	83	90	69	112	[8] 65	116	[8] 73	116	[8] 75	76
East South Central	116	72	70	60	76	66	70	84	52	72
West South Central	142	153	108	192	81	146	183	216	156	157
Mountain	85	70	52	53	35	35	70	35	78	70
Pacific	61	73	47	81	88	79	45	69	69	36

MEASLES CASE RATES

	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930	Jan. 31, 1931	Feb. 1, 1930	Feb. 7, 1931	Feb. 8, 1930
98 cities	350	172	324	203	[2] 404	220	[3] 420	278	[4] 476	317
New England	490	121	310	172	522	230	438	341	502	322
Middle Atlantic	178	110	158	117	251	111	306	145	353	176
East North Central	63	152	87	150	[5] 74	135	[6] 144	167	151	171
West North Central	2,156	310	1,829	372	1,984	467	1,521	424	[7] 1,649	610
South Atlantic	429	128	500	182	[8] 804	172	[8] 1,032	314	[8] 1,294	268
East South Central	861	12	995	36	698	24	908	54	1,024	72
West South Central	20	293	7	373	10	582	17	293	3	648
Mountain	226	150	374	247	757	220	496	396	1,123	405
Pacific	33	443	55	579	72	626	110	1,028	112	1,028

SCARLET FEVER CASE RATES

	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930	Jan. 31, 1931	Feb. 1, 1930	Feb. 7, 1931	Feb. 8, 1930
98 cities	277	266	316	272	[2] 333	288	[3] 337	292	[4] 321	323
New England	433	431	539	397	575	457	519	346	534	530
Middle Atlantic	242	220	282	212	314	226	328	239	304	260
East North Central	363	350	398	394	[5] 383	375	[6] 380	416	331	427
West North Central	296	221	321	265	323	314	386	283	[7] 519	370
South Atlantic	276	218	304	210	[8] 343	192	[8] 312	224	[8] 304	222
East South Central	396	96	465	90	483	149	512	143	419	191
West South Central	68	129	129	125	142	98	112	73	88	129
Mountain	322	493	331	344	357	379	322	414	261	361
Pacific	72	241	72	237	119	344	142	306	146	289

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1931 and 1930, respectively.
[2] Springfield, Ill., and Columbia, S. C., not included.
[3] South Bend, Ind., and Columbia, S. C., not included.
[4] St. Paul, Minn., and Columbia, S. C., not included.
[5] Springfield, Ill., not included.
[6] South Bend, Ind., not included.
[7] St. Paul, Minn., not included.
[8] Columbia, S. C., not included.

Summary of weekly reports from cities January 4 to February 7, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued.

SMALLPOX CASE RATES

	Week ended—									
	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930	Jan. 31, 1931	Feb. 1, 1930	Feb. 7, 1931	Feb. 8, 1930
98 cities	13	30	16	32	[2] 16	26	[3] 17	31	[4] 23	29
New England	0	0	0	0	0	5	0	0	0	2
Middle Atlantic	0	0	0	0	0	1	0	0	2	0
East North Central	15	27	10	36	[5] 21	19	[6] 25	39	12	34
West North Central	63	91	98	124	77	72	84	48	[7] 168	60
South Atlantic	2	0	0	6	[8] 4	2	[8] 0	6	[8] 0	4
East South Central	6	6	17	0	29	0	17	12	29	0
West South Central	37	66	27	38	34	35	51	73	81	94
Mountain	9	44	78	53	9	26	0	62	44	18
Pacific	18	146	29	123	20	152	18	152	24	126

TYPHOID FEVER CASE RATES

	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930	Jan. 31, 1931	Feb. 1, 1930	Feb. 7, 1931	Feb. 8, 1930
98 cities	4	3	5	5	[2] 6	4	[3] 5	5	[4] 4	4
New England	5	0	0	5	2	0	5	0	2	0
Middle Atlantic	2	3	2	3	3	5	2	5	1	3
East North Central	2	2	2	2	[5] 3	2	[6] 1	3	2	5
West North Central	0	2	4	12	10	2	13	4	[7] 2	2
South Atlantic	10	10	10	6	[8] 14	8	[8] 8	8	[8] 18	12
East South Central	12	6	52	12	12	18	17	6	6	18
West South Central	20	3	14	7	27	3	14	3	24	7
Mountain	17	0	9	62	17	9	0	9	0	0
Pacific	2	4	2	4	6	2	10	14	0	2

INFLUENZA DEATH RATES

	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930	Jan. 31, 1931	Feb. 1, 1930	Feb. 7, 1931	Feb. 8, 1930
91 cities	24	18	36	19	[2] 52	21	[3] 70	16	[4] 60	14
New England	5	0	10	10	12	10	34	2	46	5
Middle Atlantic	29	13	59	14	91	14	101	14	68	10
East North Central	12	12	9	17	[5] 18	17	[6] 36	13	52	12
West North Central	21	30	18	17	29	18	29	18	[7] 17	21
South Atlantic	28	34	41	24	[8] 38	34	[8] 127	12	[8] 129	12
East South Central	44	58	63	39	63	52	76	52	63	32
West South Central	76	57	79	60	83	103	100	82	73	50
Mountain	44	44	35	26	44	9	52	9	52	44
Pacific	22	12	10	12	22	15	14	2	12	7

PNEUMONIA DEATH RATES

	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930	Jan. 31, 1931	Feb. 1, 1930	Feb. 7, 1931	Feb. 8, 1930
91 cities	185	161	219	151	[2] 229	140	[3] 258	164	[4] 233	175
New England	113	184	159	126	178	138	185	193	286	160
Middle Atlantic	233	183	311	159	332	128	368	158	293	180
East North Central	110	121	124	108	[5] 125	110	[6] 177	128	176	138
West North Central	200	153	212	209	171	150	159	162	[7] 150	159
South Atlantic	243	192	237	186	[8] 280	214	[8] 345	238	[8] 325	216
East South Central	265	123	227	142	296	194	227	239	176	207
West South Central	238	189	228	221	245	288	203	292	214	270
Mountain	244	229	270	256	157	220	200	229	209	379
Pacific	134	120	118	137	103	77	115	92	72	130

[2] Springfield, Ill., and Columbia, S. C., not included.
[3] South Bend, Ind., and Columbia, S. C., not included.
[4] St. Paul, Minn., and Columbia, S. C., not included.
[5] Springfield, Ill., not included.
[6] South Bend, Ind., not included.
[7] St. Paul, Minn., not included.
[8] Columbia, S. C., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended February 7, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended February 7, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia	1	93				
New Brunswick [1]						
Quebec	1	15				9
Ontario		102		1	4	9
Manitoba	1		1	1		2
Saskatchewan					20	
Alberta [1]						
British Columbia	1	5			2	1
Total	4	215	1	2	26	21

[1] No case of any disease included in the table was reported during the week

Quebec Province—Communicable diseases—Week ended February 7, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended February 7, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Measles	58
Chicken pox	74	Mumps	17
Diphtheria and croup	45	Scarlet fever	93
Erysipelas	2	Tuberculosis	82
German measles	2	Typhoid fever	8
Influenza	15	Whooping cough	31

Quebec Province—Vital statistics—October, 1930.—Births, deaths, and marriages for the month of October, 1930, in the Province of Quebec, Canada, with deaths from certain specified causes, are shown in the following table:

Estimated population	2,735,000	Deaths from—Continued.	
Births	6,187	Heart disease	250
Birth rate per 1,000 population	26.6	Influenza	36
Deaths	2,807	Measles	10
Death rate per 1,000 population	12.1	Pneumonia	151
Marriages	1,922	Poliomyelitis	3
Deaths under 1 year	836	Scarlet fever	9
Deaths under 1 year per 1,000 births	135.1	Syphilis	16
Deaths from—		Tuberculosis (pulmonary)	174
Cancer	174	Tuberculosis (other forms)	41
Cerebrospinal meningitis	2	Typhoid fever	31
Diabetes	28	Violence	114
Diarrhea	263	Whooping cough	19
Diphtheria	35		

DENMARK

Communicable diseases—November, 1930.—During the month of November, 1930, cases of certain communicable diseases were reported in Denmark as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	3	Paratyphoid fever	1
Chicken pox	25	Poliomyelitis	5
Diphtheria and croup	548	Puerperal fever	19
Erysipelas	287	Scabies	1,079
German measles	5	Scarlet fever	171
Influenza	4,063	Tetanus	2
Lethargic encephalitis	11	Typhoid fever	7
Measles	1,424	Undulant fever (Bac. abort. Bang)	52
Mumps	303	Whooping cough	2,242

MEXICO

Tampico—Communicable diseases—January, 1931.—During the month of January, 1931, certain communicable diseases were reported in Tampico, Mexico, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	4	1	Smallpox (varioloid)	5	
Enteritis (various)		24	Tuberculosis		25
Influenza	1	1	Typhoid fever		2
Malaria	83	5	Whooping cough	11	
Measles	2				

Vera Cruz—Deaths from certain diseases—Six weeks ended December 28, 1930.—During the six weeks ended December 28, 1930, deaths from certain diseases were reported in Vera Cruz, Mexico, as follows:

Disease	Deaths	Disease	Deaths
Bronchitis	3	Pneumonia	7
Cancer	4	Septicemia	5
Diphtheria	1	Smallpox	1
Dysentery (amebic)	1	Syphilis	7
Gastro-intestinal disorders	59	Tetanus	3
Hookworm disease	4	Tuberculosis	34
Malaria	4	Typhoid fever	2

TRINIDAD

Port of Spain—Vital statistics—December, 1929 and 1930.—The following statistics for the month of December 1929 and 1930 are taken from a report issued by the Public Health Department of Port of Spain, Trinidad:

	December			December	
	1929	1930		1929	1930
Number of births	168	157	Deaths under 1 year	22	24
Birth rate per 1,000 population	29.8	27.4	Infant mortality rate per 1,000 births	130.9	152.9
Number of deaths	145	142			
Death rate per 1,000 population	25.7	24.8			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Week ended— November, 1930: 22	November, 1930: 29	December, 1930: 6	December, 1930: 13	December, 1930: 20	December, 1930: 27	January, 1931: 3	January, 1931: 10	January, 1931: 17	January, 1931: 24	January, 1931: 31	February, 1931: 7	February, 1931: 14
China:																	
Amoy	C	2															
	D	2															
Canton	C		1	1													
Shanghai	C	34	38	2													
	D	3	4														
Shensi Province	C	P															
Swatow	C	2															
Tientsin	C	1															
India	C	51,551	36,529	18,944	3,166	2,689	2,634	2,623	1,745								
	D	23,959	17,635	9,782	1,616	1,404	1,553	1,360	918								
Bassein	C	1															
Bombay	C	1	16	19	2	2	4	5					20	1			
	D	2	11	17	2	1	1	3					6	3			
Calcutta	C	27	24	33	4	6	2	10	9	7	6	6	36	29	24		
	D	12	15	16	4	4	1	7	6	4	5	5	25	19	19		
Madras	C		2	1					14	44	70	73	47				
	D		2						8	12	19	28	21	11	7		
Rangoon	C	2	1							1			1				
	D	1	1							1			1				
Tuticorin	C		1	1	4		1		1								
	D		1	1													
India (French):																	
Chandernagor	C	1	3	1		1											
	D		1						1								
Pondicherry	C		1	1	1	1	1	1	3	9	2	17	9	4	8		
	D		1		1	1	1	1	3	3	1	14	3	3	3		
India (Portuguese)	C	1		14					1								
	D	1		9													

Indo-China (see also table below):																	
Pnompenh	C		2	1		1	1							1	2		
	D					1	1								2		
Saigon and Cholon	C		2	1		1		2	1		4	4	4	1			
	D					1					2	2	2	1			
Philippine Islands: [1]																	
Ports—																	
Cebu	C	2															
	D	2															
Iloilo	C	10	1			1					1				2		
	D	14	4			3					1				2		
Manila	C	43	5														
	D	12	1														
Provinces—																	
Antique	C	47	40														
	D	34	18														
Bohol	C	49															
	D	20															
Bulacan	C	4	2														
	D	2	1														
Capiz	C	1													3	56	69
	D														2	45	55
Cebu	C	25															
	D	11															
Iloilo	C	238	50	30	11	21	13		7	5	13	3	11	41	36	57	27
	D	151	40	23	8	11	8		6	4	10	2	9	27	25	49	21
Negros, Occidental	C	122	28	56	44	38	48	33	28	19	33	40	19	32	33	6	1
	D	91	20	41	33	17	45	28	22	16	26	33	15	17	19	5	1
Negros, Oriental	C															1	
	D															1	
Pampanga	C	1															
Samar	C	4	7	16	4	4			2		12	2					
	D	2	7	12	4	4			1	1	7	1					
Sorsogon	C			5													
	D			4													
Surigao	C	1	(2)														
	D	2															
Siam	C		4	4	2	1	1	2	2		2	1					
	D		1	4	2	1	1	2	2		2	1					
Bangkok	C		3	3	2	1		1	2	1	1	2	2		1		
	D		2	2	2	1		1	2	1	1	1	1				
On vessel: S. S. Malwa from Shanghai	D	1															

[1] Figures for cholera in the Philippine Islands are subject to correction.
[2] During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, P. I.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		June, 1930	July, 1930	August, 1930	September, 1930			October, 1930			November, 1930			Dec. 1-10, 1930
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30	
Indo-China (French) (see also table above):														
Annam [1]	C	16	1	1										
Cambodia [1]	C	144	43	59	23	13	2	16		6		1		28
Cochin-China [1]	C	273	46	27	9	6	18	14	6	8		5		8

PLAGUE

Place		Aug. 24-Sept. 20, 1930	Sept. 21-Oct. 18, 1930	Oct. 19-Nov. 15, 1930	Week ended— November, 1930		December, 1930				January, 1931					February, 1931	
					22	29	6	13	20	27	3	10	17	24	31	7	14
Algeria:																	
Algiers	C	11	6	11			1	1	1				1		1		
	D			3													
Constantine, vicinity of	C			1						3	1	46			1		1
	D														1		
Oran	C	10	10	2													
	D	1	3	1													
Plague-infected rats		10	6	1													
Philippeville	C	1	3	2								1					
	D		1									1					
Argentina:																	
Cordoba Province—Chazon	C							1						1			
Jujuy Province—Palpala	C														1		
Belgian Congo	C	5		1				1									
	D	3		1				1									
British East Africa (see also table below):																	
Tanganyika	C						3		2								
	D						3		2								
Uganda	C	202	165	171	37	17	33	24									
	D	191	164	168	37	18	33	24									

Ceylon: Colombo	C	2	3	1	1		4	4	4		4	1	1	1	1		
	D	3	3	1	1		3	4	4		4	1		1	1		
Plague-infected rats				1	1	1									1		
China:																	
Manchuria—Tungliau and Nungan	C	29	1														
Shensi	C	P		1													
Dutch East Indies:																	
Batavia and West Java	C	79	107	143	53	56	41	58	54	56							
	D	76	103	146	53	56	39	58	54	57							
Plague-infected rats		3															
Java and Madura	D	260	335	501	137	127	132	161	159	143							
Egypt:																	
Alexandria	C	10	9	7		1	1	2	1	1		1				1	
	D	8	6	7				1									
Assiout	C			3		2		7	5	1		1	2	19	2	3	9
	D			1				1				1	2	2	2		4
Aswan	C					3											
Beni-Suef	C												1				
Deirout	C													19	2		
	D													2	2		
Gharbieh	C														1		
	D														1		
Girga	C	1							3	1	3					1	
	D									1	1					1	
Manfalut	C											23	5	21	4		11
	D											5	2	3	1		4
Minieh	C							1						1	1		
Port Said	C			2													
France: Marseille	C	5	4	4													
Greece (see also table below): Pyrgos	C		2														
India	C	2,497	2,371	2,721	677	746	931	905	987								
	D	1,132	1,068	1,497	443	434	499	480	548								
Bassein	C	2		1								2	1		1		
	D	3										1	1				
Bombay	C	1	2	1										1			
	D	1	2	1										1			
Plague-infected rats		47	64	30	11	5	12	4	10	9	6	13	10	6	9		
Madras Presidency	C	127	196	185	33	62	28	25	30	7							
	D	57	110	124	24	26	15	13	14								
Rangoon	C	10	2	2						1	1						
	D	9	2	1						1							
Plague-infected rats		8	1	1	1	1		2	1	1			2	1	1		
India (Portuguese)	D			3													
Indo-China (see also table below):																	
Pnompenh	C	3	2		1	3	1	1	1				1	3	2		
	D		3	1	1	3	1	1	1				1	3	2		
Saigon and Cholon	C	1	1														
Iraq: Baghdad	C		1	P	2	2									3		
	D		1		1	1									2		

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Week ended— November, 1930: 22	29	December, 1930: 6	13	20	27	January, 1931: 3	10	17	24	31	February, 1931: 7	14
Madagascar (see also table below): Tamatave	C	1	1	5		2	1	1		2							
	D		1	3		2		1									
Morocco	C			5					9		10		13				
	D								4		4		4				
Nigeria: Lagos	C	6	5	38	4	3	2		2	1	1	1					
	D	6	5	5	4	3	2		2	1	1	1					
Plague-infected rats		10	11	13	1	1	1	2	4		1						
Peru: Lima.																	
Senegal (see table below):																	
Siam	C	3	1	6													
	D	2		5													
Bangkok	C			1				1		1	2						
	D			1				1		1	2						
Nagara Rajsima	C	1	1	1		3		8	4	3	4	6	3	2	1		
	D	1	1	1		3		6	3	3	1	3	2	3	1		
Syria: Beirut	C	5		6								1				1	
Tripolitania	C			1	4	6	2	1					2	2			
	D				1								2				
Tunisia: Tunis	C			1				P	12			1	1				
Union of Socialist Soviet Republics: Transcaucasia—Karabakh	C													6			
Union of South Africa:																	
Cape Province	C	1		1		P	P										
	D	1															
Orange Free State	C	2									2						
	D	2									2						
On vessel: S. S. Marionga de Thermiotis at Avonmouth	C									1							

[1] 8 cases of plague were reported at Lima, Peru, during December, 1930. Plague infection is said to exist in interior towns north of Lima.

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
British East Africa (see also table above):							
Kenya	C	97	87	53	58	62	50
Greece (see also table above)	C				2		
Indo-China (see also table above)	C	1	2	4			
Madagascar (see also table above):							
Ambositra Province	C				4	16	
	D				4	16	
Antsirabe Province	C	24	11	21	3	10	
	D	24	11	21	3	10	
Miarinarivo Province	C	1	2	7	18	8	
	D	1	2	7	18	8	
Moramanga Province	C		27	18	20	8	
	D		27	17	20	8	
Tananarive Province	C	28	39	79	125		
	D	28	38	79	116		
Senegal:							
Baol [1]	C	62	79	48	53		
	D	48	20	23	35	4	
Dakar [1]	C	140	108	3			
	D	122	90	8			
Louga [1]	C	138	75	61	37	10	
	D	103	33	30	25	3	
Thies [1]	C	54	34	12	24	27	2
	D	30	20	4	15	23	1
Tivaouane [1]	C	119	110	20	53	31	2
	D	70	54	14	31	25	1

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Week ended— November, 1930		December, 1930				January, 1931					February, 1931	
						22	29	6	13	20	27	3	10	17	24	31	7	14
Algeria:																		
Algiers	C	3								1								
Bone	C															1		
Constantine	C				1													
Oran	C								3									
Brazil:																		
Porto Alegre (alastrim)	C	1	1	26	36	20	8											
Rio de Janeiro	C				2													
British East Africa (see also table below): Tanganyika	C	242	522	95	17	7	26	18	334	23	1	57						
	D	37	60	6	1		1		35	1		3						
British South Africa: Southern Rhodesia	C	1	1	153	95	12		4	2									
	D					2		1										

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Week ended— November, 1930: 22	29	December, 1930: 6	13	20	27	January, 1931: 3	10	17	24	31	February, 1931: 7	14
Canada:																		
Alberta	C	1	1	22		1						19			7			
British Columbia—Vancouver	C	6	2	2	3			1				1	2				2	
Manitoba	C		1													1		
Winnipeg	C												1					
Nova Scotia	C															1		
Ontario	C	20	10	19	59	7	12	3	1	1		8	8	10	3	32	4	
Kingston	C										2	4		1				
North Bay	C										1		1					1
Ottawa	C	7	5		37		8	1	1			2		1	1	1		
Sault Ste. Marie	C												1	11	8	5	6	
Toronto	C		1				2	2										
Quebec	C	5				1			1						2			
Montreal	C	7																
Saskatchewan	C	8	1	3	2	2		16						7	6	5	20	
China:																		
Changking	C	P	P	P	P	P		P	P	2								
Foochow	C	P	P	P	P		P		P									
Hong Kong	C										1				1			
Manchuria—																		
Harbin	C	2			1													
Kwantung—Dairen	C					2		1	1	1								
	D								1									
Nanking	C	P	P	P	P			P	P	P	P	P	P	P				
Shanghai—																		
Foreigners only	C	3	18	1	2			3	5	4	2	6	2	1	1			
Including natives	D		2		1				4	5	1	1	4	2	4			
Swatow	D	4	2	4	3	1			2		2	1	2	1				
Tientsin	C			1	1	1	1											
Chosen (see table below).																		
Colombia:																		
Barranquilla	C	2																
Buenaventura	C	2																
Cali	D			2				1										
Curacao (alastrim)	C	1																

Dutch East Indies:																		
Java—Batavia and West Java	C	12	11	14	26	2		2	2	2		2						
	D	5	4	4	4	1			1			1						
Sangi Islands	C	36	14		29													
	D	2	3		3													
France (see table below).																		
Greece (see table below).																		
Great Britain:																		
England and Wales	C	344	341	325	372	116	160	95	137	138	135	164	228	187	272	286		
Bradford	C		3	1	1			1				1			1			
Cardiff	C			1														
Leeds	C			1	2							2						
London	C	164	120	29	172	67	27	48	42	27	38	48	48	45	47	33		
London and Great Towns	C	268	223	52	296	136	74	112	111	105	131	162	162	154	198	194		
	D		1		1		1											
Sheffield	C														1	1		
Stoke-on-Trent	C	2	1		1										1			
Scotland	C	5																
Honduras:																		
Naco	C		5															
Puerto Castilla	C												4	7	1		1	
India	C	4,877	3,131	2,322	2,412	787	865	1,037	938	942								
	D	1,246	680	572	606	221	174	274	205	262								
Bombay	C	12	6	1				1				1	1	2	2	2		
	D	10	5					1				1	1			1		
Calcutta	C	25	14	12	9	3	5	6	4	10	19	15	15	28	28	40		
	D	21	9	11	7	3	2	4	2	7	13	10	10	16	22	29		
Cochin	C	14	3	12	25	4	5	6	7	6	7	2	5	6	8			
	D		1	1	3	2		2					1					
Karachi	C	4	4			2	1								2			
	D	3	2				1								1			
Madras	C	38	34	19	9	3	5	6	6		1	3	4	7	3			
	D	11	6	8	2			2	1			1		2				
Moulmein	C	2	1												2			
	D	1	1															
Negapatam	C	4	9	14	9	3		1	2									
Rangoon	C	3		2	1		1											
	D				1													
Tuticorin	C			1														
Vizagapatam	C			1														
India (French):																		
Chandernagor	C		3	3	3						5							
	D		2	1	1						2	1		1				
Karikal	C	9	5	1								1	2	1				
	D	9	2	1									2					
Pondicherry Province	C	22	35	38	11	7	7		5	8	8	7	11					
	D	22	33	36	11	7	5		5	7	8	7	10					
India (Portuguese)	C	9	4							3								
	D	2																

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Week ended— November, 1930: 22	29	December, 1930: 6	13	20	27	January, 1931: 3	10	17	24	31	February, 1931: 7	14
Indo-China (see also table below):																		
Pnompenh	C			2			1				2							
	D	1					1											
Saigon and Cholon	C	1	1		2	2	1		1					3	1			
	D	3	1		2	1			1					2				
Iraq:																		
Baghdad	C	1	1	2														
	D	1																
Mosul Liwa	C			69	6	7	9						1		2		1	
	D			27		1	1											
Ivory Coast (see table below).																		
Mexico (see also table below):																		
Jalisco (State) Guadalajara	D	1		3	3	1		2							1			
Juarez	C	2																
	D	1		1	1													
Mexico City and surrounding territory	C	10	12	13	9	1	2		3	1	5							
	D	6	5	3	2				6	2	1							
Vera Cruz	C				1													
Morocco (see table below).																		
Nicaragua: Porto Cabezas	C									2								
Poland	C				8	1	2						2					
Portugal:																		
Lisbon	C	50	27	16	20	11		15	11	21	17		34	27	31			
Oporto	C	1																
Siam	C			1														
Somaliland, British: Boales	C			1	1			1										
	D			1									1					
Spain	C	2	5		51	23	21	23		19	31	18						
Straits Settlements	C	8	6	5	10	3	9	2	3	3		2	1	3	1	2		
	D	3	1	1	2	1	2	2	2			1				1		
Sudan (Anglo-Egyptian)	C	42	128	82	5		3		47		47		17	1	7		3	1
	D	3	52	7	1				5		5		1		7			

Sudan (French) (see table below).																		
Switzerland: Berne Canton	C	2		1														
Syria (see table below).																		
Tunisia: Tunis	C			2								13	4	6	1			
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C		P	P	P	P		P	P	P	P	P						
Orange Free State	C	P			2	P	P	P										
Transvaal	C	P	P	P	P	P	P	P	P	P	P	P						
Upper Volta	C						6						4					
	D												2					
On vessel:																		
S. S. Clan Mactoggart at Suez	C																	2
S. S. Muncaster Castle at Manila from Hong Kong	C										1							
S. S. Matheran at Suez from Calcutta	C														1			

Place		June, 1930	July, 1930	August, 1930	September, 1930	October, 1930			November, 1930			December, 1930		
						1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31
Indo-China (see also table above)	C	213	238	93	192	32	62	164		86		38	9	14
Ivory Coast	C							4		2		9		
Sudan (French)	C	76	34	39	P		17					43		96
	D	18		3			2					16		4
Syria: Beirut	C	7	2	1										

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
British East Africa (see also table above):							
Kenya	C	186		424		653	
Chosen	C	3	2				
Seishin	C	2					
France	C	1					
Greece	C	1	6				
Mexico: Durango (see also table above)	D	3	3	2			1
Morocco	C	3	8	4	4	20	
Turkey	C	51	21	19	74		
	D	13	4	2	1		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths, P, present]

Place		July 27–Aug 23, 1930	Aug 24–Sept. 20, 1930	Sept 21–Oct. 18, 1930	Oct. 19–Nov 15, 1930	Week ended— November, 1930: 22	November, 1930: 29	December, 1930: 6	December, 1930: 13	December, 1930: 20	December, 1930: 27	January, 1931: 3	January, 1931: 10	January, 1931: 17	January, 1931: 24	January, 1931: 31
Algeria:																
Algiers	C	2	3		1		2									
Constantine Department	C	3		2	1		1		1			3	3		6	
Oran	C	1	1	3			3		2						1	
Bulgaria	C	1	4	6	3	1	1	3	6	3				9		
	D									1						
China:																
Manchuria—Harbin (see also table below)	C	2	2	1				1								
Shanghai	C	1														
Chosen (see table below).																
Czechoslovakia (see table below).																
Egypt:																
Alexandria	C	1	3	1	2	1	1									
	D		1		2											
Beheira Province	C		1							1						
	D									1						
Cairo	C	7	2						1	1						
Port Said	C	4	1	1	2										1	
Ireland:																
Irish Free State—																
Mayo County—																
Castlebar	C	1														
Westport	C	1														
Latvia (see table below).																
Lithuania (see table below).																
Mexico:																
Durango	D		1	2												1
Mexico City, including municipalities in Federal District	C	9	7	8	11	1	1		12	5	2					
	D	2	2	2	4	2	3		2	4	1					
San Luis Potosi	D							1	1							
Morocco	C	8	2		3	1				8						
	D			1												
Palestine	C	3	3	3	3	1	6			1	1		2		1	

Poland	C	34	23	22	37	12		21	9	18	5	28	11			
	D	3	1	2		1		3	3	3						
Portugal: Oporto	C	1		2	4	2	2	2							1	
Rumania	C	9	4	14	41	19		15								
	D	2			2	1		2								
Spain	C		1	2	4			1								
	D		1	2				1								
Tunisia	C	10	6	12		5		23							7	
Turkey (see table below).																
Union of South Africa:																
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P				
Municipality of East London	C		2	1	1	1				P		2	1			
Natal	C	P	P	2	P											
Orange Free State	C	P	P		P					P	P					
Transvaal	C	P	P	P	P	P	P			P	P	P				
Yugoslavia (see table below).																

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
China: Harbin (see also table above)	C	14	5		3		
Chosen: Seoul	C	3	2	1	7	1	
Czechoslovakia	C		1			16	
Greece: Athens	C	6	6	4	4	4	
Latvia	C	3	1	2			
Lithuania	C	18	7	24	1	5	1
	D		1	2		1	
Turkey	C	7	11		28	3	2
Yugoslavia	C		2		2	2	
	D		1		1		

YELLOW FEVER

	Cases	Deaths
Brazil:		
Rio de Janeiro State—		
Cambucy, Jan. 1-25, 1931	3	3
Friburgo (imported), Jan. 25-30, 1931	1	
Padua, Jan. 18-24, 1931	1	1
Para, July 29, 1930		1
Gold Coast		
July 10, 1930	1	
Albosso, Aug. 4, 1930		1
Nigeria: Lagos, July 12, 1930 (probably laboratory infection)	1	

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PUBLIC HEALTH REPORTS

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THE PREVALENCE OF INFLUENZA

United States.—Reports from State health officers for the week ended February 28, 1931, show a decrease in the prevalence of influenza as compared with the preceding week in the eastern part of the country generally, but there was an increase in some of the North Central States and on the Pacific coast. (See pp. 601 and 602.) A total of 10,590 cases of influenza was reported to the Public Health Service for the week ended February 28, 1931, as compared with 11,135 cases for the preceding week, and with 2,337 for the corresponding week of last year.

The general death rate in large cities of the United States for the week ended February 28, 1931, as published by the Bureau of the Census, was 14 per thousand population. For the corresponding week of last year the rate was 14.1 per thousand.

Europe.—In 107 great towns of England and Wales, 456 deaths from influenza were registered during the week ended February 14, 1931, as compared with 331 influenza deaths for the preceding week. Of these deaths, 116 occurred in London. The outbreak in Liverpool was said to be decreasing. During the six weeks from January 4 to February 14, 1931, 1,585 influenza deaths were registered in the 107 great towns, as compared with 434 influenza deaths during the corresponding period of 1930.

The general death rate of the 16 principal towns of Scotland for the week ended February 7, 1931, was 16.8 per thousand population, which is 3.4 per thousand below the average for the corresponding weeks of the last five years. The death rate for respiratory diseases in Scotland for the week ended February 7, 1931, was 3.4 per thousand, which is 1.9 per thousand below the average.

In Madrid, Spain, the general mortality declined to 31.3 per thousand for the week ended February 14, 1931, from 47.7 and 36.7, respectively, for the two preceding weeks. The general mortality was above the average in Barcelona, Sevilla, Valladolid, Cadiz, Murcia, Cartagena, Alicante, Gerona, Bilbao, and Coruna. It was said to be normal in Valencia.

A LIMITED RAT FLEA SURVEY OF SAVANNAH, GA.

By Carroll Fox, *Medical Director, United States Public Health Service*

During the early spring and late summer of 1927, Surg. K. F. Maxcy, in the course of studies of endemic typhus fever, conducted a limited rat flea survey of Savannah, Ga.

The data concerning this survey have been preserved at the New York quarantine station, where the fleas and other ectoparasites were identified. They are now published in the belief that the information adds a distinct item to our knowledge of distribution of rat fleas.

The survey was made in two separate parts: The first part included 387 rats trapped in February and March; the second part included 500 rats trapped in September and October of the same year.

Most of the trapping was done in the business section of the city. All rats were trapped alive in cage traps and brought to the laboratory without covering the cages or putting them in sacks. At the laboratory the rats were etherized, singly, in a closed box, and combed. All parasites combed from a single rat (including any found on the floor of the ether box) were put in alcohol in a vial, labeled with the serial number of the rat, and sent to the New York quarantine station for identification.

Fleas were identified by Surg. Carroll Fox and Acting Asst. Surg. G. C. Sherrard. Specimens of all types of mites found were sent to Dr. H. E. Ewing, of the National Museum, for identification or confirmation.

The results of the survey are given in Tables 1 and 2. The fleas found were *Xenopsylla cheopis*, *Ceratophyllus fasciatus*, *Leptopsylla musculi*, *Echidnophaga gallinacea*, and *Ctenocephalus canis* and *felis*. All rats were *Rattus norvegicus*.

Table 1.—*First part of survey, February and March, 1927. (Includes 33 rats trapped between January 27 and 31. These yielded 210 fleas.)*

Number of rats	Total number of fleas	Fleas per rat	Xenopsylla cheopis	Xenopsylla cheopis per rat	Ceratophyllus fasciatus	Ceratophyllus fasciatus per rat	Leptopsylla musculi	Leptopsylla musculi per rat	Echidnophaga gallinacea	Echidnophaga gallinacea per rat	Ctenocephalus canis and felis
387	1,764	4.6	891	2.3	361	0.9	460	1.2	52	0.13	5

Table 2.—*Second part of survey, September and October, 1927*

Number of rats	Total number of fleas	Fleas per rat	Xenopsylla cheopis	Xenopsylla cheopis per rat	Ceratophyllus fasciatus	Ceratophyllus fasciatus per rat	Leptopsylla musculi	Leptopsylla musculi per rat	Echidnophaga gallinacea	Echidnophaga gallinacea per rat	Ctenocephalus canis and felis
500	4,097	8.2	3,599	7.2	22	0.04	355	0.71	117	0.23	4

It should be noted that the marked increase in fleas per rat, recorded in the autumn months, is altogether made up of an increase in *Xenopsylla cheopis*. The virtual disappearance of *Ceratophyllus fasciatus* in September and October is not unexpected in the climate of Savannah. The relatively high incidence of *Leptopsylla musculi* is of interest. *Echidnophaga gallinacea* is not uncommonly found on rats in warm climates.

Besides fleas there were found the usual rat louse, *Polyplax spinulosa*, and four species of mites, *Laelaps echidninus*, *Laelaps hawaiiensis*, *Liponyssus bacoti*, and *Hoplopleura acanthopus*, the last named apparently accidental.

A PUBLIC-HEALTH SURVEY OF OKLAHOMA

By A. J. McLaughlin, *Medical Director, United States Public Health Service*

Since the beginning of the present century the scope of public-health work has expanded from police power efforts to control communicable diseases to the prevention of all diseases and the promotion and conservation of health of the entire population. Necessarily, therefore, a public-health survey of a State must include much more than a survey of the health department itself. It must consider the public-health activities, existent and potential, of many agencies, official and unofficial, engaged in public-health work which are operating independently.

The earliest efforts at disease prevention were based upon the psychology of fear, and our first boards of health were born of fear and hope—fear of the epidemic diseases and hope that these "plagues" could be prevented by rigid quarantine and isolation. These boards were given enormous police powers and control over individuals for the common good. The early administrative health officers had the police power as their only weapon, and they fought these diseases as policemen. The flood of knowledge of the causation of disease following the epoch-making discoveries of Pasteur, Koch, and others, from 1870 to 1890, gave new impetus to the vigorous application of police power. With the knowledge that these diseases were caused by frail organisms, or germs, easily killed by disinfection, it was natural that health officers should visualize the possibility of stamping out epidemic diseases by rigid enforcement of laws and ordinances providing for quarantine, isolation, and disinfection. This system failed signally to suppress epidemics or prevent their spread; and the reason was apparent when the significance of the "carrier" became known in the first decade of the twentieth century. Doctors were blamed for not reporting. Although prompt reporting should be required, it became apparent that even if doctors reported all of the cases seen, there would be unreported and uncontrolled many more

cases. These unreported cases were either atypical, mild with few symptoms, or healthy carriers with no symptoms whatever, and none of these could be controlled by police power methods of quarantine, isolation, and disinfection.

This knowledge made health officers realize that control of these diseases could be secured only by the voluntary cooperation of all individual citizens and that such cooperation could be secured only by education of the public in personal, family, and public hygiene. About the same time health officers realized that the duties placed upon them by law demanded the expansion of public health to include the noncommunicable diseases and the promotion and conservation of health. These objectives obviously could be achieved only by public-health education. Health officers relinquished the dream that all public-health activity could be exercised by personnel on the pay roll of the health department and began to seek means of correlating the work of other departments and unofficial agencies with the work of the official department of health.

In the first decade of the present century unofficial agencies undertook important public-health activities of wide scope and boards of education had developed plans and procedures in school hygiene. The medical profession has always been a factor in public-health work, but only in the last decade has it shown willingness to assume its true function in regard to preventive health work. Of all the outside agencies, it is the most important and the most essential to success.

No health department now has, nor can it hope to have, sufficient funds to finance all public-health activity. The responsibility for the health of all the people is placed squarely on the shoulders of the health officer, and it is his duty to formulate a comprehensive plan that will include the public-health activities, existent and potential, of the medical profession, the educational authorities, and the unofficial agencies. The main objective is to have all parts of the field covered. It matters little which agency does the work; the important thing is to have the work done.

With the experience of the past three decades it is not difficult to set down an outline of organization for a State health department showing the major divisions it should possess and the details of organization of those divisions. It is much more important and also more difficult to put down a plan for the utilization of all the possible public-health activities in the State in a joint complete program. I shall therefore first outline briefly why and how agencies outside the health department should be organized and utilized in so far as their relationship to public health is concerned. Second, there will be considered the existing machinery for public-health work in the State department of health—its defects and its needs. Finally, recommendations will be made which have for their purpose the better utilization of outside

agencies and for the correction of defects in the department of health organization.

Section I. Organization of Outside Agencies

In formulating a plan for utilizing all agencies engaged in public-health activities outside of the department of health in a comprehensive joint program with a single direction, it is necessary to study carefully the work and potentialities of three factors, viz:

1. The organized medical profession.
2. The State educational authorities.
3. The unofficial health agencies.

THE ORGANIZED MEDICAL PROFESSION—THE STATE MEDICAL SOCIETY

The following are the two greatest defects in public-health administration to-day:

1. The failure to do any more than scratch the surface in the most important field of public health, viz, the hygiene of the preschool child.

2. The lack of properly organized local health units to apply, locally, the policies of the State health department.

Adequate supervision of the preschool child in any considerable percentage of the total children can be secured only by the activity of the individual practicing physician. Laudable efforts are made through parent-teacher associations, baby welfare stations, and public-health nurses, but the percentage of children reached is small. We must have a healthy public opinion demanding examination of the preschool child, with a county medical society establishing facilities to aid the practicing physician in responding to this demand. In order to get for the preschool child early diagnosis, preventive advice and treatment, and correction of defects, we are compelled to focus as our primary objective upon the greatest problem confronting the medical profession to-day, viz, "How can adequate medical, surgical, and preventive advice and treatment be made available, within easy reach of all citizens, at a cost within their ability to pay?"

The layman has been educated and now knows that diseases can be prevented or their hazard minimized by early diagnosis and treatment. The average citizen, for financial reasons, does not consult a doctor until he is definitely ill, and very often postpones calling the doctor until he is confined to bed. It is not the cost itself, but the lack of definite knowledge of what that cost may be. More important still, in smaller cities and towns there is an absolute lack of clinics and out-patient departments. Many careless statements and inaccurate generalizations are made in regard to the cost of medical care. In the larger cities clinics and out-patient departments have developed independently of the medical society as a unit. For this reason the

trite statement is often heard that the poor in large cities and the rich anywhere can secure the best medical service, but that for the intervening classes such treatment is not available.

The cost of the best medical care, where available, is worth what is paid for it. The cost has not increased in greater proportion than the cost of other services; but medical and surgical diagnostic and treatment facilities have been elaborated to include many new procedures, worth their cost, which were not included years ago. The greatest problem is not the cost but the absence of facilities for modern diagnosis and treatment at a definite known cost.

It is the collective obligation of the organized medical profession to solve this great problem. The American Medical Association has recognized this collective obligation, and every county medical society is urged to accept its problem and discharge its duty. In the large cities the problem is complicated by group clinics, industrial clinics, and other installations outside the control of the medical society. In the smaller cities the situation is less complex and the solution less difficult. Difficult or easy, the solution should come from the medical society. The demand for these services is based upon sound public opinion and must be satisfied by some agency. Protracted delay in grappling with this problem, seizing the initiative, and establishing such facilities can result only in makeshift clinics established by institutions and agencies independent of the organized profession or by quacks and charlatans. The installation of pay clinics by the medical society, or with its approval, gives the individual citizen valuable aid in avoiding the so-called clinic of the quack and charlatan.

The pay clinic, either with a fixed rate or a sliding scale, is a response to the demand of public opinion. The organized medical profession as a whole has been reluctant to take steps to respond to the demand. Such clinics have been established by individuals or groups of doctors, in connection with hospitals or medical colleges, or by endowments or foundations. Unfortunately, this insistent public demand has been capitalized by quacks and fakers who often establish clinics with elaborate and very impressive equipment.

The development of facilities for early diagnosis and early treatment by the organized medical profession at a known cost is, frankly, socialization of the practice of medicine. Such limited socialization is inevitable. It rests with the profession whether it shall seize the initiative and satisfy this demand or stand passively by and be compelled to submit to the process while it is carried out by outsiders.

State medicine may not come as a result of inactivity of the organized profession, though it is always a menace; but a gradual evolution, a haphazard growth in which the organized profession is inactive and inarticulate, will produce a chaotic condition which may be even worse than State medicine. The county medical societies must pro-

vide out-patient departments or clinics where examination, early diagnosis, and treatment of ambulatory cases can be made. Usually there is a small hospital which can be equipped and expanded for this purpose. It should be organized on a business basis, dividing the clientele into the following classes:

1. Indigents, whose care and treatment are to be paid for by the county.
2. Those unable to pay full fees, but who can pay something, according to income.
3. Those able to pay full fees.

A county medical society which organizes for public-health work by establishing facilities for early diagnosis and treatment and by fostering a full-time county health unit will be rendering its greatest contribution to public service. Without active participation by the local medical society as a unit, county health work is extremely difficult and generally a failure.

Enthusiastic workers who are poor waiters often attempt county public-health organization without this active participation by the county medical society. Such efforts are doomed to failure. You can not build successfully and permanently in advance of public opinion, and the most important factor in public opinion and in public-health progress is the collective dictum of the medical society. If this active participation of the county medical society can not be secured, then attempts to organize in that county should be deferred until public opinion brings about the desired change of attitude. No public-health work should be initiated in any county except through the direct approval and action of the medical society as a unit.

These facts bring to the State medical society tremendous responsibilities and duties. It is through the initiative of the State society that these activities of the county medical societies will be begun and carried to fulfillment.

In accepting the solution of this great problem as its collective obligation, the State medical society pledges itself to stimulate and assist the county medical societies in discharging this obligation as rapidly as the local units are able to establish these facilities.

It is not sufficient to have the best, most modern equipment and technical skill in one or two large centers in a State. It becomes the duty of the State medical society to arrange for the distribution of such equipment and technical skill by decentralization, by the establishment in county seats of such facilities so that they may be available and within easy reach of every citizen.

The fact that the problem is difficult and calls for executive ability, statesmanship, and energetic, collective action, does not alter the fact that it is the problem of the State medical society. It is not expected that the State medical society can achieve the ideal immediately, but

many county medical societies are ready now; and following the example of these, within 10 years every county in the State could be so organized.

Incidentally, the improvement in facilities for practice in county seats would tend to solve another of the pressing problems, namely, the unequal distribution of new graduates. The graduate of a modern, class A medical school to-day is accustomed to use the latest technique, methods, and equipment for early diagnosis and treatment. He knows he will not find facilities for such practice in the small towns. He therefore avoids the country towns and crowds the large cities. If the practice of medicine could be made attractive in country towns by the establishment of modern facilities for early diagnosis and treatment by the county medical society, the young graduate would be very glad to practice in such towns.

THE STATE EDUCATIONAL AUTHORITIES

The chief educational authorities which are now doing, or are equipped to do, public-health work in Oklahoma are the following:

1. The University of Oklahoma, at Norman.
2. The Oklahoma Agricultural and Mechanical College, at Stillwater.
3. The State Teachers Colleges, at Edmond, Ada, Tahlequah, Alva, Durant, and Weatherford.

There are several other colleges which have possibilities for aiding in some phase of public-health education. In addition to these there is the entire public-school system of the State, the most powerful and most valuable instrument we possess for the teaching of personal and family hygiene. The extension division of the university has already done some creditable work in extra-rural postgraduate courses for doctors in pediatrics and obstetrics. These courses have great value in maternal and child hygiene. More funds should be made available and this work expanded. The dental school has a fine opportunity to do educational work through the dentists and in conjunction with the department of health. A start has been made, but the scope of the work should be increased.

Medical colleges have one tremendously important duty and function in relation to public-health administration. It is the establishment of an adequate and more effective system of teaching preventive medicine and hygiene to the undergraduate medical students. The present practice varies in different colleges. Most schools have either a professor of preventive medicine or some one delegated to give lectures on this subject. In regard to adequacy and effectiveness, the major defect is a lack of practical demonstration. Teaching of hygiene consists of didactic lectures, the material for which is found in any textbook on the subject. What is needed is a close affiliation with a

health department, where the student can see preventive medicine in actual practice. The student will remember much from actual demonstrations, but lectures alone are often ideal soporifics, in view of the fact that they produce sleep and have little after effect.

The desirability and need for this more adequate teaching of preventive medicine is obvious for many reasons. It is essential in his own interest that the student be adjusted to the change of accent in the practice of medicine from curative to preventive; but there are two very definite reasons why the public-health administrator desires this improvement in teaching:

1. There will be graduated to enter practice a body of young doctors who will understand the objectives and efforts of the health officer and will, therefore, be sympathetic and helpful.

2. Health officers at present are recruited from the practicing medical profession by political appointment. Their only knowledge of preventive medicine upon their first appointment is the instruction they have received in medical college. This has either been entirely neglected or has consisted of a few lectures with no actual demonstration of public-health work. These men have to learn something entirely new, and in the process of learning will make many costly mistakes.

Some years ago it was hoped that postgraduate schools of public health would cover the need of trained health officers. This dream has not been realized. Our new appointees are not postgraduates in public health; they are ordinary practicing physicians, and appointees will continue to be such under our political system of government. Their training must come from actual experience in a health department or by short courses, and this is greatly facilitated by having a foundation acquired by an adequate undergraduate course in preventive medicine.

Just as the State department of health is vitally interested in the teaching of preventive medicine to the undergraduate medical students, the dean of the medical college is especially desirous of having the course in preventive medicine and hygiene made practical by demonstrations of applied preventive medicine as practiced by health departments. For this reason a model health department is desirable in Oklahoma City so that its work can be used for demonstration purposes in teaching preventive medicine to students. The model health department is also necessary for post graduate instruction for health officers and nurses, in summer courses, and during the regular school year.

The dean of the college of medicine is keenly interested in the problem of unequal distribution of doctors. He, therefore, is also interested in the wider distribution of high-grade medical service, by establishing centers with modern facilities and equipment in county

seats. He can assist in this decentralization and, by making the small town more attractive for modern practice, secure a better distribution of the young graduates. The dean can by means of public-health education activities of the university, assist in educating the public to demand early diagnosis and preventive and corrective treatment from the physicians for children from 1 to 6 years old. He can also render tremendous service by undergraduate and post-graduate instruction in preparing the doctors to respond to that demand.

The extension division of the agricultural and mechanical college is already doing work closely allied to public health in its work of home economics. Health and nutrition are being taught in the school of home economics, and, through the extension division, this knowledge is being carried to the farm homes. This work is extremely valuable, has great possibilities in spreading knowledge of diet and nutrition, and should be continued and expanded. State teachers colleges and normal schools have a wonderful opportunity for real service by more adequately teaching child hygiene to teachers. The lack of training in the practical application of child hygiene methods is a real handicap to public-health work in the schools. The need is most apparent in teachers of the first to the sixth grades and in the schools of the small city or county. In these situations it is not uncommon for one public-health nurse to be carrying an overload of 8,000 pupils. If the teachers are trained, they understand and are helpful; and in spite of the overload a creditable result is often obtained. The teacher is a very intelligent possibility in public health. She teaches hygiene and health habits and observes the children through the entire school day. Her training in hygiene is, therefore, one of the vital essentials in the health of the school child. Presidents of teachers' colleges have made very creditable efforts in many States to give good courses in health education. They have good textbooks and excellent theoretical instruction. With one or two exceptions, the same defect occurs which was charged to the teaching of preventive medicine in medical colleges, viz, too little practical demonstration of applied child hygiene. To correct this defect it is necessary to have a doctor and nurse trained in child hygiene on the faculty, and to have an arrangement with the city or town in which the college is located by which the city schools are used by the doctor and nurse to demonstrate to the students, in groups, the practical work of child hygiene. To this end the State health department should organize counties in which teachers colleges are located with a model county health department. This model health department could then be used for practical demonstration purposes to make the teaching of applied child hygiene to teachers more effective.

THE UNOFFICIAL HEALTH AGENCIES

The origin of unofficial voluntary health agencies and their development into great public health machines was due to two things: First, the restriction of official health work to an attempt to control communicable disease by police power alone; and, second, the demand of public opinion, based upon new medical knowledge, that new methods be tried, methods independent of police power and based largely upon education. The impatient desire to expand public-health work to include all diseases and to attack the communicable diseases directly by education of the individual citizens was a response to the seeming unwillingness of official health departments to expand and utilize methods other than those based on police power. The health officers were not unwilling to expand, but it was impossible to secure funds from official sources for untried methods, the efficiency of which had yet to be demonstrated.

The greatest contribution of the unofficial voluntary agencies was the demonstration in the first decade of the present century that educational methods were effective in the prevention of disease and the reduction of death rates and that such methods were legitimate weapons for the use of official health departments. Thus, as pioneers, voluntary health agencies have been of great help to official health departments in demonstating the value of new procedures and in financing these demonstrations when funds for such purposes could not be secured by the official health department.

These two separate movements advancing side by side—the expansion of official health departments and the development of voluntary health agencies—were bound to conflict, and at first there was misunderstanding, distrust, and antagonism. In the second decade much of this conflict had disappeared, and in the last decade the policy of unofficial health agencies in their relation to health departments has been so clearly defined, understood, and accepted that there is to-day no reason for conflict. This clarification of policy was brought about by conferences of health officials with the heads of the great national unofficial health agencies. It is now clearly understood that an unofficial health agency is an auxiliary of the duly constituted health authorities, with freedom of action in untilled fields, and the obligation to turn over to the health department any legitimate public-health activity whenever the health department can secure the funds to carry on the work. The voluntary health agency has another obligation; it is that when the health officer has a comprehensive program of public-health activity it shall accept and agree to carry out such parts of that program as are within its power. And so to-day the proper utilization of the voluntary public-health agencies depends upon the health officer himself. They increase the total

budget for public health far beyond the amount which the health officer can secure by official appropriations. The Oklahoma Public Health Association is doing excellent work with a very limited appropriation.

The gross seal sale for the State is about $45,000. Of this, 5 per cent goes to the National Tuberculosis Association. About seventy per cent of the remainder is retained for local expenditures, and something over $15,000 is the budget left for the State association. The seal sale results are far below what they should be. A maximum of $200,000 might be expected and it is probable that concerted effort by the State department of health, the organized medical profession, the educational authorities in support of the association could quickly boost the sales to above $100,000. This association is a great asset for public health work in the State as its funds can be used to cover gaps in the official program left uncovered because of lack of official funds.

Valuable work is done in health education clinics for stimulation of early diagnosis and public-health nursing.

NECESSITY FOR A PUBLIC-HEALTH ADVISORY COUNCIL

In the foregoing pages the principal agencies outside the health department which are doing or should be doing health work have been considered. How can the work of these various agencies be included in a general program and coordinated with the work of the official State health department?

Public health in its broad modern sense includes not only the activities of the State department of health, but the activities of these other official and unofficial agencies as well. One of the most effective ways of incorporating these activities in a comprehensive State-wide program of public health is to give them representation in some form of joint council, committee, or board. State boards of health could be used to afford representation to these other agencies, but as a matter of fact are seldom so used. In two States, Alabama and South Carolina, the State medical society is, in effect, the State board of health and so functions by means of a committee. Eleven States require all members of the board of health to be physicians, and 21 other States specify that a certain number of the board members must be physicians.

Massachusetts, New York, Connecticut, Ohio, Maine, and West Virginia have a public-health council which functions chiefly as an advisory body to the commissioner of health, who is the executive head of the department. Even in the States where the executive power is vested in the board, it is the modern custom to delegate this power to the commissioner or State health officer, the board

acting as an advisory council on matters of law, regulation, and policy.

With these facts in mind it is fair to assume that members of a State board of health should be appointed and hold their office by virtue of their ability to contribute technical or scientific advice or because they could coordinate with the work of the board, activities of organizations which they represent. The presence of physicians on the board partially carries out this idea, provided they are carefully selected for their qualifications or represent the organized profession.

The responsibility for the health of all the people is placed by law on the State board of health and its executive, the commissioner of health. It is the commissioner's primary duty to formulate a comprehensive plan of public health for the State which will include activities now carried on by other departments of the State government, by the organized medical profession, and by unofficial voluntary agencies. It is obvious, therefore, that in formulating such a plan and carrying it out the commissioner would be greatly assisted by having the executives or authorized representatives of these other departments or agencies as members of his board or of a public-health council.

Legislation can be enacted which would state definitely how the board should be composed, providing for representation upon that board of the agencies doing public-health work. Pending such legislation, the governor could appoint a special public-health advisory council for the purpose of coordinating all State public-health activities in one comprehensive plan. This council should consist of the following, four of whom to be appointed by the governor:

Three members of the Oklahoma State Medical Society designated by the board of trustees.

State Superintendent of Public Instruction.

Dean of the college of medicine.

Director extension division University of Oklahoma.

Member nominated by the State Dental Society.

President of one of the State teachers colleges.

The executive officer of the Oklahoma Public Health Association.

The fact that there is a statutory authority for a board of health which has never been put into effect makes it possible to have instead of a public health council, a board of health, whose personnel would be identical with the council suggested above. This could be effected by a legislative act amending sections 8666 and 8667, Compiled Oklahoma Statutes, 1921, and a suggested draft of such an act is appended to this report.

Such an act would effect the desired liaison between the department of health and the extra departmental health activities and would also give to the commissioner of health that security of tenure which he now lacks and which is so much to be desired.

Section II. Organization of the Department Itself

STATE BOARD OF HEALTH

Although the State constitution provides for a board of health, none has been established. This is fortunate; and what is needed now is a legislative enactment specifying the members that should constitute said board and giving the board the authority to select one of its physician members as executive secretary, and nominate him for the governor's appointment of commissioner of health.

THE COMMISSIONER OF HEALTH

The following general observations will show the necessity for an experienced administrator as commissioner with security of tenure.

Oklahoma has many unique features. It is only 41 years since its lands were opened for settlement and 23 years since it achieved statehood; yet in this brief period over 200,000 farms have been established, a stupendous oil industry has been developed, and commerce and industry have kept pace with this rapid development. It now has nearly two and a half million inhabitants. Its gain in population is without parallel for any similar area. In considering Oklahoma from any viewpoint, diversity is the word which best expresses its varied character. Every conceivable type of topography exists—mountains, hills, irregular plains, and various types of valleys. Climate is extremely variable, due to topography, distance from large bodies of water, and cyclonic storms. The variation in rainfall is from 45 inches in the southeast to 18 inches in the arid northwest portion. Racially, Oklahoma has a very high percentage of native whites in the population (about 85 per cent). There are less than 2 per cent foreign born, and for a southern State its negro quota is small, only 7.3 per cent. Its original proprietors, the Indians, now constitute less than 3 per cent of the total. The foreign population, though small in numbers, is concentrated in limited areas as Pittsburg County (Italians in coal mining) and the large cities. They therefore add to the complexity of the problem. Although the Indian population is now small, the Indians constitute a serious public health problem, because of concentration in certain counties and for other reasons. In Rogers, Craig, and Cherokee Counties, Indians form from 9 to 12 per cent of the total population; in Mayes County 13 per cent, Delaware County 19 per cent, and in Adair County 24.7 per cent.

The rapid development of the oil industry has overshadowed the other natural resources, but there is a considerable coal-mining industry. Ottawa County forms a part of the tri-State zinc area, the greatest producer of zinc in the world. There is a large lumber industry in the southeastern counties, but Oklahoma must be considered as an agricultural State, and at least one-half of its population is dependent directly or indirectly upon farming. A peaceful agricultural county to-day may become a wild boom area to-morrow by the discovery of oil. With this background it may be conceded that Oklahoma's public-health problems are complex and intricate. It is obvious that they need an experienced, resourceful health officer to cope with these problems. It requires a man with vision, courage, and pertinacity to meet these kaleidoscopic changes in the picture and to look ahead and try to anticipate future changes. In what way has Oklahoma met this need?

Unfortunately, politics is a highly developed game in Oklahoma, and governors not only change every four years, but sometimes in less time, because of impeachment proceedings. When the governor goes out, the State health commissioner goes out also, and another physician without any public-health experience comes in. In 14 years, from 1915 to 1929, six governors have held office in Oklahoma, and each governor brought in a physician of his choice for commissioner of health.

It is detrimental in itself to place in charge of a State health department a physician with no training or experience in public health, but this is a lesser crime as compared with the removal of an incumbent who has, though inexperienced, after a few years, perhaps, begun to learn something about his job. This insecurity of tenure is the greatest obstacle to public-health progress in Oklahoma. It is not limited to the commissioner alone, but all the subordinate personnel have the same insecurity of tenure. There is no civil service or other protection afforded. If the commissioner were safe from removal without just cause, he could protect and retain the necessary personnel.

BUREAU OF ADMINISTRATION

The bureau of administration consists of the commissioner, assistant commissioner, and such stenographic and clerical help as is necessary. This bureau exercises general control over and coordinates the activities of the other bureaus, determines policies, and approves programs.

BUREAU OF PUBLIC HEALTH EDUCATION

There is a so-called bureau of public health education, consisting of a director and one stenographer. They do general publicity work. The director is a layman with close liaison with the press. They send

out weekly bulletins to a mailing list of 1,100 names, including the State newspapers. Public-health education has not developed to such an extent as to warrant giving it a special bureau status. This work should be carried on in a bureau of administration under the direct supervision of the commissioner. A much wider and more fruitful expansion of public-health education can be secured by the commissioner without expense to the health department by utilizing the great possibilities of the public-school system and the extension work of the university and colleges. The commissioner could arrange for a committee on public health education from the proposed board of health as follows:

The superintendent of public instruction.
The director, extension division, University of Oklahoma.
Member of State dental society.
President of one of the teachers colleges.
Executive officer Oklahoma Public Health Association.

The machinery for public-health education represented by the above committee is already in operation. The educational authorities alone have an investment of many millions in the equipment and personnel which reaches the most hopeful age group for public-health education. The commissioner, through his committee, by coordinating and expanding the work now being done in public-health education, will achieve infinitely more than by attempting to secure large appropriations for public-health education within his own department.

BUREAU OF DENTAL HEALTH EDUCATION

Just why dental health education should have a bureau status is not clear. It could operate in the administration bureau with other public-health education activities, directly under the commissioner, or in a bureau of maternity and child hygiene. This is a mere detail of administration. A splendid piece of work has already been accomplished by the director of the bureau of maternity and child hygiene, and ambitious and sound plans have been made for expansion. The director has sought twin objectives: (1) To educate parents and children in regard to the necessity of preserving the early teeth and giving proper dental care to children; (2) to secure the interest of the dental profession in treatment of children to insure a proper response to the demand created by objective No. 1. She has secured the support and active participation in such a program by the dental profession; and, through the extension division of the university and State dental society, courses for dentists are given accentuating preventive service for children. The work of this bureau is one of the outstanding achievements of the State health department.

BUREAU OF LABORATORIES

The laboratory covers a wide range of diagnostic work, water and sewage analysis, milk, and manufacture of typhoid bacterine. In 1929–30 the operations were increased to a total of 35,146 examinations, and typhoid bacterine sufficient for about 50,000 immunizations was manufactured and distributed. Over 25,000 Wassermann examinations were made, checked by a Kahn test (microscopic precipitin test).

BUREAU OF RURAL SANITATION

The brightest spot in the picture of public-health work in Oklahoma is the development of nine full-time county health units. These were organized under rather adverse conditions and without the authority of a permissive law for their establishment. In 1929 such a law was passed and signed by the governor.

The most common defect in many State health departments is poor contact between the center (State department of health) and the periphery (local health units). This defect can be remedied in two ways:

1. By building up an adequate State health organization with liberal travel allowance to maintain frequent contact.
2. By developing local full-time county units in strategic points and ultimately in every county which will maintain constant touch with the State department of health.

The county is the logical unit of government in large States, and it is the only unit functioning on a state-wide basis that has the power to levy taxes and make expenditures for public health. The trend toward full-time county health officers is one of the striking features of public-health development of the past 15 years. In 1915 there were only a dozen counties organized on a full-time basis, while in 1930 over 500 counties were so organized. It is much better to develop full-time county units even if the response is slow. The building up of a big State machine would give a temporary advantage and more prompt results if the large appropriations could be secured, which is extremely doubtful. Such a State machine destroys local initiative, the priceless asset we must encourage and develop if we hope for permanent success in State public-health organization. The success of county health department organization in Oklahoma is surprising in view of the instability of the central administration, because of frequent changes in the commissionership. The reason is found in having a State appropriation for assisting counties in organizing full-time health departments. This appropriation should be increased and more counties organized as rapidly as possible.

BUREAU OF FOOD, DRUGS, AND SANITARY INSPECTION

The personnel of the bureau of food, drugs, and sanitary inspection consists of a director, who is also assistant commissioner of health, and six inspectors. The director is a layman, but an extremely valuable man because of 16 years' continuous service in the department and a keen appreciation of State conditions and needs. The work done in control of food and drugs is negligible, and the activities of the division are largely absorbed by the license problem. This license system by which hotels, cafés, groceries, markets, bottling works, etc., are licensed, serves no useful purpose. The bulk of the inspections are in cities, where the inspection should be a municipal function.

BUREAU OF VITAL STATISTICS

There is a registrar of vital statistics and an assistant registrar. These positions have the same insecurity of tenure as the position of commissioner. There are also three clerks. Each city, incorporated town, and township constitute primary registration districts. Local registrars are appointed by the State health commissioner and receive a fee of 25 cents for each certificate of birth and death and each burial permit. Reporting of deaths is estimated about 90 per cent complete. Seventy per cent of the reported deaths are reported by physicians, 20 per cent by undertakers, and 10 per cent by others.

Birth reporting is estimated as 90 per cent complete—about 97 per cent by doctors and 3 per cent by midwives, although midwives are not recognized officially in the State. The model law standard certificates and the International List of Causes of Death are used. Nothing more than a perfunctory recording of these data may be expected with untrained direction and frequent changes in personnel. Even with the present staff more utilization of the data and better results would be possible by installing punch cards and tabulating machines.

BUREAU OF COMMUNICABLE DISEASES

There is a so-called bureau of epidemiology, which consists of a competent epidemiologist and a part-time clerk. With this meager personnel very little real control is possible. Reports of contagious diseases are sent in by the part-time county superintendents of health, who are paid according to the population of the county from $20 to $125 per month. Some of them take considerable interest and make regular and satisfactory reports; others know little of public health and have apparently little interest in it.

The central office sends out report cards to 2,500 physicians each week. About 60 per cent return the cards.

There is also in the department what has been called a bureau of venereal diseases. Venereal disease activities of the department can

scarcely be said to warrant a bureau status. There is an appropriation of $10,800 for venereal disease control, spent, roughly, as follows:

1 doctor, 2 assistants	$3,000
2 nurses, 1 clerk	2,700
Biologics and supplies	4,300
	10,000

The chief activity is operating a venereal disease clinic in Oklahoma City. The great majority of patients treated are from Oklahoma City. There is no good reason for maintaining such a clinic in one large city of the State. The care of such patients is a city obligation.

The bureaus of epidemiology and venereal diseases should be consolidated. Sufficient clerical help should be provided to establish and maintain an endemic index in every county for each principal disease for each month in the year. It should be checked monthly, if possible.

BUREAU OF MATERNITY AND CHILD HYGIENE

The title of the existing bureau, is "Bureau of Maternity and Infancy." The present bureau is incomplete in that it takes no cognizance of the school child. It also lacks medical direction, although the director is a highly intelligent capable woman with the qualities of a good executive. The bureau has been doing excellent educational work, and by means of conferences it brings about the examination of over 4,000 children per year, with the discovery of 17,000 to 19,000 defects. Medical direction is not needed so much for the conduct of the work, but is a serious lack in bringing the local medical society into its proper place in the program. The bureau has little or no dealings with the local medical society as a collective unit, but deals directly with the public, with individual doctors, with women's clubs, and with the prospective mothers themselves. Besides the director, there is a supervising nurse, four field nurses, and a secretary. The personnel of this bureau is exceptionally capable, but should have a physician as director. It would be well also to consolidate with this bureau the work being done by the bureau of dental health education. This is child hygiene work of the best type. The name of the bureau should then be "Bureau of Maternity and Child Hygiene."

BUREAU OF SANITARY ENGINEERING

One of the amazing performances in public health in Oklahoma is the work of the bureau of sanitary engineering. For years the engineer alone constituted the entire bureau; only in the past year has he had some professional assistance, provision having been made

for an assistant engineer, whose time is largely devoted to the problems of malaria and milk. In spite of this lack of personnel, the State engineering bureau has a record of achievement of which the State may justifiably be proud.

In the past two years the plans for over $5,000,000 worth of water and sewage projects were checked and passed upon. A check of over 300 water plants was maintained. Malaria activities and milk control work have been undertaken, sanitary surveys of streams have been made upon request, and a great deal of miscellaneous work has been done in swimming-pool sanitation, camp sanitation, conducting a school for water-plant operators, and in plumbing, garbage disposal, and nuisance problems. The complexity and urgency of the sanitary problems is obvious in studying the unique growth of this young State with its oil rushes, boom towns, and mobs of floating population.

Not only is the director of the engineering bureau without sufficient personnel, but his salary is not commensurate with his responsibilities and the work he has done in attempting to discharge his duty. He answers many calls for assistance from other departments of the State government, and there is in this State, as in many other States, a tendency to burden this department with duties which should at least be financed by other State departments. The lack of personnel has prevented this abuse from growing to undue proportions, but steps should be taken to prevent absorbing time and money of the bureau in projects only remotely connected with health. The great majority of the problems of pollution of streams call for solution not for public health but for aesthetic, fish conservation, or industrial reasons. There should be a State committee on stream pollution for handling these problems not directly affecting public health. Such a committee might consist of representatives of the fish and game commission, the corporation commission, the Isaak Walton League, the Mid-Continent Producers Association, with the attorney general and the State sanitary engineer.

It is good policy and saves State money to have the State sanitary engineer give his technical advice and have supervision of such projects. It avoids building up duplicating machinery, but this work must be secondary to the primary function of preventing disease. The funds for financing such projects could be secured by the committee suggested above from the department directly interested and served.

Financial

The expenditures of State health departments vary from less than 3 cents per capita in Iowa and Nebraska to 30 cents in Delaware and 25 cents in Florida. The average for 48 States is about 9 cents per capita. The total amount appropriated for the State department of health of Oklahoma is slightly below the average, with 8½ cents per

capita. It is not, therefore, so much a matter of total appropriation as it is a matter of how that appropriation is divided and expended. There is given herewith a budget showing how the total appropriation of Oklahoma's State department of health is now divided and expended:

DEPARTMENT OF PUBLIC HEALTH

Funds appropriated for fiscal year ending June 30, 1931:

Appropriated for—	Amount
Commissioner	$4, 800
Assistant commissioner	2, 400
Secretary and stenographer	1, 800
Bookkeeper	2, 000
Stenographers (3), one at $1,800, one at $1,500, and one at $1,200	4, 500
Director of bureau of maternity and infancy	3, 000
Secretary	1, 500
Head nurse	2, 400
Field nurses (4) at $1,800 each	7, 200
Printing—other than office supplies, office supplies, and communication	7, 000
Traveling expenses, including motor supplies and motor repairs	5, 000
Bureau of public health education—	
Director	2, 400
Stenographer	1, 500
Bureau of diagnostic laboratory—	
Chemist	3, 000
Assistant chemist	2, 400
Bacteriologist and director	3, 000
Assistant bacteriologist	2, 400
Manufacture of typhoid vaccine	2, 500
Record clerk	1, 800
Extra help, janitor service	1, 200
Bureau of sanitary engineering: Sanitary engineer	3, 000
Bureau of pure food, drugs, and sanitary inspection—	
Supervisor (sanitary engineer)	2, 400
Inspectors (6 at $1,800 each)	10, 800
Bureau of vital statistics—	
Registrar	2, 400
Assistant registrar	1, 800
Statistical clerks (3 at $1,500 each)	4, 500
Contractual services—	
Traveling, all departments	17, 500
Communication	3, 000
Printing	3, 500
Other expenses	2, 100
Supplies—	
Office supplies	1, 200
Medical supplies, administration	7, 000
Equipment—	
Office equipment	750
Laboratory equipment	900
Control of venereal diseases	10, 800
Epidemiology, disease prevention	5, 000
Rural sanitation and disease control in rural districts and county health units	35, 000
Malaria control	10, 000
Total	183, 450

By readjustment of these items of expenditure and by consolidation of some units into bureaus, a well-balanced organization for a

State health department is given, within the total appropriation now received, viz, $183,450:

Proposed reorganization and budget for the State department of health

Bureau of administration:		
Commissioner of health	$6,000	
Chief inspector	2,400	
Chief clerk	2,400	
Secretary-stenographer	1,800	
Stenographer	1,800	
Stenographer-clerk	1,200	
Travel	4,000	
Equipment, office supplies, communication, printing, and miscellaneous contingent expenses	9,000	
		$28,600
Bureau of vital statistics:		
Registrar	2,400	
Assistant registrar	1,800	
4 statistical clerks	6,000	
		10,200
Bureau of laboratories:		
Director (physician)	5,000	
Chemist	3,000	
Assistant bacteriologist	2,400	
Stenographer	1,800	
Clerk	1,200	
Extra help, manufacture of biologics	2,500	
Janitor service	1,200	
Supplies and equipment	2,000	
		19,100
Bureau of county health work:		
Director (physician)	5,000	
Stenographer	1,500	
Rural sanitation, county health units	32,000	
Travel	5,000	
		43,500
Bureau of communicable diseases:		
Director (physician)	4,500	
Epidemiologist	3,600	
Stenographer and clerk	1,800	
Morbidity clerk	1,200	
Biologics clerk	1,200	
Biologics and medicines	10,000	
Travel	3,600	
		25,900
Bureau maternity and child hygiene:		
Director (physician)	4,500	
Assistant director (health education and oral hygiene)	3,600	
Supervisor of nurses	3,000	
4 field nurses at $1,800 each	7,200	
Secretary-stenographer	1,800	
Stenographer-clerk	1,500	
Printing	5,000	
Travel	6,000	
		32,600
Bureau of sanitary engineering:		
State sanitary engineer	5,000	
1 assistant engineer	3,500	
1 assistant engineer	2,400	
1 junior engineer	1,800	
1 stenographer	1,500	
1 clerk	1,200	
Travel	5,000	
		20,400
		183,900

SUMMARY

Administration	$28, 600
Vital statistics	10, 200
Laboratories	19, 100
County health work	47, 100
Communicable diseases	25, 900
Maternity and child hygiene	32, 600
Sanitary engineering	20, 400
	183, 900

This reorganization, within the total funds now appropriated for the department, provides for the expansion necessary in some bureaus and for necessary increases of salary, and includes all the present personnel, with certain exceptions to be noted later. It includes all items in the present budget, although these items are sometimes grouped in one or other bureaus. The salary of director of laboratories and of the director of county health work is placed at $5,000 for each bureau. At present the director's salary is partly paid from each. This arrangement is possible only because of the fact that the director has the training, experience, ability, and energy efficiently to direct both bureaus. It can not be considered permanent, and provision is made for a full-time physician in charge of each bureau. The only persons in the present personnel for whom the proposed budget does not provide are the inspectors in the food, drugs, and inspection division. The assistant commissioner is valuable in so many ways as a chief inspector that provision is made for him as such in the bureau of administration. The work of the inspectors under him is of such a character as to seem an unwarranted and futile use of funds appropriated for public health purposes. Their work is a combination of collection of license fees and of inspections which, in the main, should be made by cities and towns.

Fundamental Defects

1. Insecurity of tenure of the office of the commissioner, depriving the State of a trained executive left long enough in office to plan constructively and build a well-balanced effective department.

2. The lack of a board or council which would include representatives of the principal health agencies, official and unofficial, in the State. Such a board or council would make possible a comprehensive program covering every phase of public health activity, alloting to each agency the work it is now doing or is able and willing to do.

3. Partial failure to secure the active participation of the State and county medical societies, as organized units, in preventive medicine. The only possible way of bringing about the discovery and correction of defects and early prophylactic measures in any considerable percentage of children below school age is by the activity of county medical societies, stimulated and organized for this service by the State medical society. The writer has found many county medical socie-

ties who see their duty clearly, are willing to organize on preventive lines, but are appalled by the clerical work, the social service work, and other details of organization. They are willing to organize, and believe in the plan; but they are busy men, and the funds available are small. The greatest obstacle to such organization is the lack of money to employ expert help in solving their local problems. The State medical society must help them by providing, when necessary, clerical help and advice in the details of arranging for out-patient clinics, scale of pay in those clinics, and the basis upon which the fees are adjusted.

Recommendations

Following are the recommendations, which are confined to the correction of the fundamental defects:

1. The passage of an act (tentative copy of which is printed herewith) providing for a board of health and also for a reasonably secure tenure of office for a competent commissioner of health. This would remedy defects 1 and 2.

2. Formal declaration of policy by the State Medical Society accepting the following problem as their collective obligation and pledging themselves to bring about the desired activity of county medical societies as rapidly and as thoroughly as possible:

How can adequate medical, surgical, and preventive advice and treatment be made available within easy reach of all citizens, at a cost within their ability to pay?

Appendix A

AN ACT Amending sections 8666 and 8667, compiled Oklahoma Statutes, 1921, relating to the creation, membership, appointment, powers, duties, and compensation of the State board of health and prescribing the manner of selecting a State commissioner of health and of fixing the salary, specifying the duties of the office, providing for the selection of and salaries of other employees, for the removal from office and recess appointments of members of the State board of health, and declaring an emergency

Be it enacted by the people of the State of Oklahoma:

SECTION 1. That section 8666, Compiled Oklahoma Statutes, 1921, be, and the same is hereby, amended to read as follows:

SEC. 8666. A State board of health composed of nine members is hereby created, four of whom shall be appointed by the governor, by and with the advice and consent of the Senate, the terms of the first appointments to be as follows: One member to be appointed for a term of one year; one member for a term of three years; one member for a term of four years; and one member for a term of six years. All subsequent appointments on said State board of health shall be made for a term of six years. In addition to these four members, which shall include three physicians duly licensed to practice medicine in this State and in good professional standing and one dentist duly licensed to practice dentistry in this State and in good professional standing, the State board of health shall consist of the State superintendent of public instruction, the dean of the college of medicine of the University of Oklahoma, the director of the extension division of the University of Oklahoma, the president of one of the State teachers colleges to be designated by the governor, and the executive officer of the Oklahoma Public Health Association. Each of said members shall be a qualified elector of the State. In case of death, removal from the State, resignation, removal from office as hereinafter provided, or inability to act, the governor shall appoint a successor for the unexpired term, and the appointment of said successor shall be confirmed by the senate in the same manner as in the original appointments.

Immediately after their appointment the members of said board shall take and subscribe to the oath of office prescribed by the constitution or such oath or oaths as may otherwise be prescribed by law, and shall organize by electing a president and vice president and choosing a secretary who shall be a physician, skilled in the specialty of public health and preventive medicine, and at the time of appointment not a member of the board. Upon selection the secretary shall become ex-officio a member of the board. The board shall adopt rules and regulations for the government of the board and adopt and use an official seal.

SEC. 2. The president, vice president, and secretary of the board shall perform the usual duties of such officers and such other duties as the board or the statutes may provide; and the secretary of the board, in addition to his duties as secretary, shall be State commissioner of health and shall take the oath of office prescribed by the constitution or such oath or oaths as may otherwise be provided by law, and whose duties shall be the active supervision of the execution and enforcement of all the rules and regulations of the Board and the laws of the State relating to the public health, and such other duties as shall be prescribed by law or the rules and regulations of the State board of health. The State commissioner of health shall use the seal of office and be empowered to conduct investigations and administer oaths when necessary in the discharge of his official duties.

SEC. 3. The State board of health shall fix the salary of the State commissioner of health at not to exceed ——— dollars per annum. The other employees of the board of health shall be selected by the commissioner of health and confirmed by the board. Their salaries shall be fixed within reasonable limits, on recommendation of the State commissioner of health, and within the appropriations made for such purposes by the legislature. The State board of health shall submit a budget outlining proposed expenditures and activities and reasons therefor to the State budget officer each biennium.

SEC. 4. That Section 8667, Compiled Oklahoma Statutes, 1921, be and the same is hereby amended to read as follows:

SECTION 8667. The State Board of Health shall have power to make any and all needful rules and regulations for the prevention and cure and for the prevention of the spread of any communicable disease; to establish quarantines and to isolate any person affected with a communicable disease; to remove or cause to be removed any dead, decayed, putrid or other substance that may endanger the health of persons or of domestic animals; to condemn and cause to be destroyed any impure, adulterated, or contaminated articles of food that may be offered for sale; to superintend the several boards of health in the counties, cities, villages, towns, and townships of the State; to establish rules and regulations for the keeping and reporting of all vital and morbidity statistics; to promote the public health in keeping with the discoveries of science; and to perform such other duties as may be prescribed by law.

SEC. 5. *Removal from office.*—That the members of the State board of health shall be subject to removal from office only in the manner provided for the removal of elective State officials.

SEC. 6. *Compensation.*—The appointive members of the State board of health shall receive $10 per day for the time devoted to their duties, and all members shall receive their actual traveling and hotel expenses while attending the meetings of the board and for committee work when duly authorized by the board. There shall be four quarterly meetings of the board annually, to be designated by the board, and not more than four called meetings of the board in any one year.

SEC. 7. *Recess appointments.*—In case of recess appointment of any member of said State board of health, such appointment shall be made by the governor within ten days after the nomination has been referred and transmitted to each member of the senate for approval or disapproval, and upon the approval in writing of a majority of the senate, said recess appointment shall become effec-

tive. Should any member of the senate fail to signify approval or disapproval within sixty days from the date of mailing of notice of the appointment, the same shall be deemed approved by such member.

SEC. 8. *Emergency.*—It being necessary for the preservation of the public peace, health, and safety, an emergency is hereby declared to exist, by reason whereof this act shall take effect and be in full force from and after its passage and approval.

COURT DECISION RELATING TO PUBLIC HEALTH

Statute making certified copy of death certificate prima facie evidence upheld.—(Kentucky Court of Appeals; Massachusetts Mutual Life Insurance Co. *v.* Bush, 33 S. W. (2d) 351; decided Nov. 21, 1930.) A State law contained the following provision:

And any such [certified] copy of the record of birth, sickness, or death, when properly certified by the State registrar to be a true copy thereof, shall be prima facie evidence in all courts and places of the facts therein stated.

In an action brought to recover on a life-insurance policy, the court of appeals had the following to say regarding the above-quoted statutory provision:

The [circuit] court refused to allow the paper [a properly authenticated copy of a death certificate] to be read to the jury, and the company excepted. The statute only makes the certificate prima facie evidence. It is within the power of the legislature to prescribe rules of this sort. The statute is valid. The circuit court erred in refusing to allow the certificate to be read. * * *

DEATHS DURING WEEK ENDED FEBRUARY 21, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended February 21, 1931, and corresponding week of 1930. (From the Weekly Health index, issued by the Bureau of the Census, Department of Commerce)

	Week ended February 21, 1931	Corresponding week, 1930
Policies in force	75, 140, 437	75, 485, 684
Number of death claims	17, 290	15, 322
Death claims per 1,000 policies in force, annual rate	12. 0	10. 6

Deaths* [1] *from all causes in certain large cities of the United States during the week ended February 21, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Feb. 21, 1931				Corresponding week, 1930		Death rate [2] for the first 8 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (81 cities)	9,918	14.5	887	[4] 70	13.7	897	14.2	13.3
Akron	42	8.5	6	59	8.6	4	8.4	8.9
Albany [5]	38	15.3	3	59	15.9	3	15.3	16.5
Atlanta	114	21.4	12	123	13.6	11	16.8	17.1
White	51	-------	4	63	-------	4	-------	-------
Colored	63	(6)	8	230	(6)	7	(6)	(6)
Baltimore [5]	259	16.6	26	88	15.5	19	17.7	15.4
White	200	-------	18	78	-------	12	-------	-------
Colored	59	(6)	8	125	(6)	7	(6)	(6)
Birmingham	89	17.2	14	141	13.4	7	15.0	14.2
White	40	-------	4	69	-------	3	-------	-------
Colored	49	(6)	10	243	(6)	4	(6)	(6)
Boston	276	18.3	18	51	17.3	28	18.0	15.8
Bridgeport	43	15.2	3	50	13.1	4	14.1	14.2
Buffalo	180	16.1	20	82	14.2	16	14.8	14.1
Cambridge	25	11.4	3	60	8.3	0	14.6	13.6
Camden	54	23.7	6	105	14.5	2	19.3	14.6
Canton	20	9.8	3	69	12.9	2	10.7	11.8
Chicago [5]	849	12.7	62	55	12.5	84	12.5	11.7
Cincinnati	160	18.2	6	36	19.6	14	17.8	17.4
Cleveland	265	15.2	17	49	12.1	22	11.9	12.2
Columbus	93	16.4	7	68	13.8	7	14.5	14.7
Dallas	60	11.5	11	-------	14.5	7	12.6	13.9
White	49	-------	9	-------	-------	6	-------	-------
Colored	11	(6)	2	-------	(6)	1	(6)	(6)
Dayton	65	16.4	9	126	10.8	4	13.5	10.7
Denver	96	17.2	9	87	18.8	9	16.2	15.7
Des Moines	31	11.2	6	106	12.8	6	12.5	13.5
Detroit	376	11.9	51	81	13.6	70	9.4	10.6
Duluth	29	14.9	2	49	12.3	3	12.0	11.7
El Paso	41	20.4	8	-------	17.2	3	21.1	20.0
Erie	32	14.2	5	93	9.0	2	11.5	11.5
Fall River [5] [7]	35	15.8	7	159	19.9	6	13.5	14.0
Flint	21	6.7	3	38	8.6	8	7.4	9.6
Fort Worth	32	10.0	0	-------	13.3	5	11.7	13.0
White	26	-------	0	-------	-------	3	-------	-------
Colored	6	(6)	0	-------	(6)	2	(6)	(6)
Grand Rapids	23	7.0	0	0	11.4	2	9.4	10.9
Houston	73	12.3	4	-------	15.4	3	12.2	13.5
White	53	-------	3	-------	-------	3	-------	-------
Colored	20	(6)	1	-------	(6)	0	(6)	(6)
Indianapolis	141	19.9	8	66	18.3	5	15.5	17.1
White	121	-------	7	66	-------	4	-------	-------
Colored	20	(6)	1	67	(6)	1	(6)	(6)
Jersey City	84	13.7	10	89	14.1	3	14.5	13.1
Kansas City, Kans.	49	20.8	3	62	15.8	6	16.5	13.3
White	35	-------	3	74	-------	4	-------	-------
Colored	14	(6)	0	0	(6)	2	(6)	(6)
Kansas City, Mo.	134	17.1	6	46	14.9	6	15.2	14.3
Knoxville	32	15.3	4	85	13.2	3	14.3	14.8
White	29	-------	4	95	-------	2	-------	-------
Colored	3	(6)	0	0	(6)	1	(6)	(6)
Long Beach	23	7.9	1	24	8.3	2	11.0	10.4
Los Angeles	258	10.2	17	49	11.7	19	12.4	12.6
Louisville	87	14.7	10	86	15.4	6	17.1	15.1
White	64	-------	8	79	-------	3	-------	-------
Colored	23	(6)	2	133	(6)	3	(6)	(6)
Lowell [7]	23	11.9	3	76	16.6	6	14.7	14.8
Lynn	25	12.7	4	104	12.2	2	13.2	12.5
Memphis	90	18.1	14	148	16.0	3	17.3	17.2
White	45	-------	9	150	-------	1	-------	-------
Colored	45	(6)	5	145	(6)	2	(6)	(6)
Miami	31	14.4	5	127	16.4	1	14.1	13.2
White	20	-------	3	106	-------	1	-------	-------
Colored	11	(6)	2	177	(6)	0	(6)	(6)

Footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended February 21, 1931, etc.—Continued

City	Week ended Feb. 21, 1931				Corresponding week, 1930		Death rate [2] for the first 8 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Milwaukee	144	12.7	12	52	11.9	16	10.7	10.8
Minneapolis	116	12.8	9	58	10.2	10	12.6	11.6
Nashville	59	19.8	7	104	17.9	4	17.1	17.1
White	34		4	80		3		
Colored	25	(6)	3	177	(6)	1	(6)	(6)
New Bedford [7]	32	14.8	7	186	11.6	4	13.9	11.5
New Haven	42	13.5	2	38	18.0	3	13.2	15.4
New Orleans	172	19.2	11	60	18.3	10	21.0	20.3
White	97		8	66		4		
Colored	75	(6)	3	49	(6)	6	(6)	(6)
New York	1,732	12.7	166	69	12.1	182	14.3	12.0
Bronx Borough	235	9.2	24	54	8.8	24	10.3	8.4
Brooklyn Borough	575	11.4	64	68	11.5	67	13.4	11.1
Manhattan Borough	704	20.2	59	101	17.9	74	21.5	17.8
Queens Borough	168	7.6	16	44	7.6	14	9.5	7.9
Richmond Borough	50	16.0	3	54	11.1	3	14.6	14.4
Newark, N. J	114	13.3	15	78	14.2	17	14.7	14.5
Oakland	72	12.8	2	26	9.1	4	12.2	12.8
Oklahoma City	46	12.2	9	124	13.6	8	11.6	10.5
Omaha	57	13.7	8	34	13.1	4	15.1	14.4
Paterson	33	12.4	5	86	13.9	1	15.0	13.0
Philadelphia	596	15.8	57	83	16.0	45	16.7	13.8
Pittsburgh	304	23.5	32	110	16.9	31	18.1	15.5
Portland, Oreg	70	11.9	0	0	11.4	1	13.0	14.5
Providence	84	17.2	5	46	15.2	9	15.9	15.7
Richmond	79	22.4	8	117	17.4	4	18.3	16.7
White	52		5	110		0		
Colored	27	(6)	3	130	(6)	4	(6)	(6)
Rochester	102	16.0	8	73	15.9	5	13.8	12.5
St. Louis	351	22.1	16	54	15.8	15	18.6	15.2
St. Paul	69	13.0	4	41	8.8	2	11.0	11.5
Salt Lake City [5]	27	9.8	2	30	15.6	6	12.9	14.6
San Antonio	65	14.1	9		17.0	12	15.5	19.8
San Diego	51	17.0	3	61	17.4	2	16.7	16.6
San Francisco	224	18.0	15	100	12.4	8	14.9	14.2
Schenectady	32	17.4	4	117	13.1	1	11.4	10.6
Seattle	87	12.2	8	76	11.9	3	12.5	11.6
Somerville	33	16.4	0	0	13.5	3	12.0	13.0
South Bend	24	11.6	2	50	14.4	2	8.4	9.9
Spokane	26	11.7	5	130	13.5	2	13.1	13.5
Springfield, Mass	36	12.3	1	15	15.3	5	14.0	14.8
Syracuse	63	15.4	8	95	12.9	5	13.6	13.2
Tacoma	37	17.9	4	103	12.7	3	15.1	12.2
Toledo	85	15.0	2	18	15.4	5	13.0	14.3
Trenton	46	19.4	3	52	17.7	5	19.8	18.0
Utica	34	17.3	0	0	17.4	4	16.4	15.2
Washington, D. C	196	20.7	18	100	17.6	22	19.0	16.3
White	112		5	41		16		
Colored	84	(6)	13	223	(6)	6	(6)	(6)
Waterbury	25	12.9	2	60	13.0	5	11.6	10.9
Wilmington, Del.[7]	28	13.7	4	86	14.2	5	16.9	16.0
Worcester	49	13.0	2	27	18.7	9	15.6	15.2
Yonkers	29	10.9	2	52	7.7	1	11.2	8.9
Youngstown	58	17.5	9	126	9.8	1	11.8	10.8

[1] Deaths of nonresidents are included. Stillbirths are excluded

[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.

[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.

[4] Data for 76 cities.

[5] Deaths for week ended Friday.

[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25, Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended February 28, 1931, and March 1, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended February 28, 1931, and March 1, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Feb. 28, 1931	Week ended Mar. 1, 1930	Week ended Feb. 28, 1931	Week ended Mar. 1, 1930	Week ended Feb. 28, 1931	Week ended Mar. 1, 1930	Week ended Feb. 28, 1931	Week ended Mar. 1, 1930
New England States:								
Maine	6	4	71	7	48	13	0	1
New Hampshire		3	21		82	4	0	0
Vermont			1		4	1	0	0
Massachusetts	30	89	53	7	481	748	4	5
Rhode Island	7	5	1		1	1	0	0
Connecticut	9	23	133	10	438	23	2	3
Middle Atlantic States:								
New York	120	169	[1] 92	[1] 43	1,099	762	20	36
New Jersey	53	118	104	27	721	561	4	11
Pennsylvania	99	174			2,444	945	16	19
East North Central States:								
Ohio	67	75	826	65	580	1,291	7	12
Indiana	42	15	126		878	118	8	20
Illinois	152	174	245	20	1,427	683	12	10
Michigan	38	83	261	5	270	765	11	46
Wisconsin	14	27	249	41	381	1,202	3	5
West North Central States:								
Minnesota	11	15	2	3	67	271	1	2
Iowa	7	10	1	27	15	776	1	5
Missouri	27	56	100	12	551	44	14	18
North Dakota	9	4			6	37	2	5
South Dakota	4	3			14	104	0	1
Nebraska	9	14	80	4	4	653	2	8
Kansas	13	19	344	3	27	467	3	11
South Atlantic States:								
Delaware		1	7	2	24	4	0	0
Maryland [2]	24	27	352	54	727	18	1	2
District of Columbia	31	10	8	1	90	21	1	0
Virginia								2
West Virginia	13	9	169	24	62	70	0	2
North Carolina	14	35	365	36	419	15	2	6
South Carolina	9	22	3,463	1,082	160		9	2
Georgia [3]	11	15	1,421	126	134	114	3	14
Florida	6	7	204	5	135	228	3	2

[1] New York City only. [2] Week ended Friday. [3] Typhus fever, 1931, 1 case in Georgia.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended February 28, 1931, and March 1, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Feb. 28, 1931	Week ended Mar 1, 1930	Week ended Feb. 28, 1931	Week ended Mar. 1, 1930	Week ended Feb. 28, 1931	Week ended Mar. 1, 1930	Week ended Feb 28, 1931	Week ended Mar. 1, 1930
East South Central States:								
Kentucky	2	--------	9	--------	208	56	2	8
Tennessee	7	14	355	127	277	190	3	6
Alabama	24	13	407	212	531	191	4	3
Mississippi	8	11	--------	--------	--------	--------	2	24
West South Central States:								
Arkansas	--------	10	166	89	1	15	0	5
Louisiana	47	19	151	21	9	144	4	7
Oklahoma [4]	17	17	178	86	4	405	1	2
Texas	36	20	33	64	111	151	1	4
Mountain States.								
Montana	1	--------	--------	--------	1	63	1	3
Idaho	--------	--------	4	--------	4	23	3	4
Wyoming	1	4	--------	--------	2	16	1	1
Colorado	6	12	--------	--------	147	150	2	1
New Mexico	4	5	1	2	27	52	1	10
Arizona	5	9	5	5	157	7	3	9
Utah [2]	2	--------	--------	3	--------	257	2	9
Pacific States:								
Washington	11	8	--------	1	44	248	2	8
Oregon	8	6	77	81	99	48	0	1
California	57	57	555	45	939	1,433	6	14

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Feb 28, 1931	Week ended Mar 1, 1930	Week ended Feb. 28, 1931	Week ended Mar. 1, 1930	Week ended Feb 28, 1931	Week ended Mar. 1, 1930	Week ended Feb 28, 1931	Week ended Mar. 1, 1930
New England States:								
Maine	0	0	19	75	0	0	1	4
New Hampshire	0	0	4	18	0	0	0	0
Vermont	0	0	7	7	0	2	0	0
Massachusetts	2	0	378	304	0	0	2	0
Rhode Island	0	0	58	20	0	0	0	1
Connecticut	0	0	40	124	0	0	0	0
Middle Atlantic States:								
New York	2	2	951	678	6	7	17	21
New Jersey	0	0	272	258	0	0	1	2
Pennsylvania	0	2	595	521	0	0	10	6
East North Central States:								
Ohio	3	2	707	437	54	240	12	6
Indiana	0	0	410	213	137	201	3	2
Illinois	1	2	547	717	33	112	4	6
Michigan	1	3	386	414	32	60	1	5
Wisconsin	0	0	161	227	6	36	1	5
West North Central States:								
Minnesota	3	0	119	154	4	6	6	2
Iowa	0	0	120	119	54	77	0	2
Missouri	0	0	232	118	50	132	0	5
North Dakota	0	1	28	42	1	41	--------	1
South Dakota	0	0	38	15	21	33	0	0
Nebraska	0	0	56	155	55	55	1	1
Kansas	1	1	76	159	103	71	1	2
South Atlantic States:								
Delaware	0	0	30	6	0	0	0	0
Maryland [2]	1	0	142	109	0	0	3	2
District of Columbia	0	0	18	24	0	0	0	1
Virginia	--------	--------	--------	--------	--------	--------	--------	--------
West Virginia	1	0	21	49	4	51	7	13
North Carolina	0	1	47	44	0	30	2	0
South Carolina	1	1	11	11	0	2	6	10
Georgia [3]	1	0	69	47	0	0	17	5
Florida	0	0	4	9	0	2	3	6

[2] Week ended Friday.
[3] Typhus fever, 1931, 1 case in Georgia.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended February 28, 1931, and March 1, 1930—Continued

Division and State	Poliomyelitis: Week ended Feb. 28, 1931	Poliomyelitis: Week ended Mar. 1 1930	Scarlet fever: Week ended Feb. 28, 1931	Scarlet fever: Week ended Mar. 1, 1930	Smallpox: Week ended Feb. 28, 1931	Smallpox: Week ended Mar. 1, 1930	Typhoid fever: Week ended Feb. 28, 1931	Typhoid fever: Week ended Mar. 1, 1930
East South Central States:								
Kentucky	0	0	91	117	11	14	6	0
Tennessee	0	0	48	32	1	13	1	4
Alabama	0	0	24	25	8	3	5	6
Mississippi	0	0	27	14	18	9	4	6
West South Central States:								
Arkansas	0	0	13	11	10	10	6	3
Louisiana	0	1	22	22	33	2	8	10
Oklahoma [4]	0	1	20	37	121	140	7	5
Texas	0	0	28	40	60	96	1	10
Mountain States:								
Montana	1	0	44	63	1	7	0	2
Idaho	0	0	12	5	2	13	2	0
Wyoming	0	0	39	7	2	9	0	1
Colorado	0	1	54	19	11	30	2	0
New Mexico	0	0	9	14	1	1	0	3
Arizona	0	0	2	31	1	37	0	3
Utah [2]	0	0	11	14	0	4	0	0
Pacific States:								
Washington	0	0	68	79	33	85	0	8
Oregon	1	0	32	48	32	22	0	2
California	3	2	120	264	45	68	5	3

[2] Week ended Friday.   [4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
January, 1931										
Alabama	16	195	681	57	1,945	12	3	293	14	33
Montana	4	19	25		18		0	243	27	6
Nevada		4	14		3		0	6	0	0
Oklahoma [1]	4	160	910	61	172	22	4	204	453	35
Pennsylvania	35	684		1	4,887		11	2,604	5	59
South Dakota	2	80	2		32		3	83	202	6
Texas	10	195	385	362			2	248		36
Virginia	27	184	11,332	13	1,031	30	3	369	6	28
Washington	12	71	46		332		1	239	141	11

[1] Exclusive of Oklahoma City and Tulsa.

January, 1931	Cases
Actinomycosis:	
Pennsylvania	2
Chicken pox:	
Alabama	458
Montana	165
Nevada	2
Oklahoma [1]	169
Pennsylvania	5,391
South Dakota	129
Virginia	803
Washington	613
Diarrhea and dysentery:	
Virginia	134
Dysentery:	
Oklahoma [1]	5
Pennsylvania	1
German measles:	
Montana	2
Pennsylvania	125
Washington	337
Impetigo contagiosa:	
Washington	3
Lead poisoning:	
Pennsylvania	6
Leprosy:	
Washington	1
Lethargic encephalitis:	
Alabama	4
Pennsylvania	6
Washington	3
Mumps:	
Alabama	150
Montana	133

[1] Exclusive of Oklahoma City and Tulsa.

Mumps—Continued.	Cases
Oklahoma [1]	27
Pennsylvania	1,400
South Dakota	49
Washington	271
Ophthalmia neonatorum:	
Oklahoma [1]	2
Pennsylvania	18
Puerperal septicemia:	
Pennsylvania	12
Rocky Mountain spotted or tick fever:	
Nevada	1
Scabies:	
Washington	15
Septic sore throat:	
Montana	3
Oklahoma [1]	46
Tetanus:	
Oklahoma [1]	1
Pennsylvania	4
Trachoma:	
Oklahoma [1]	5
Pennsylvania	2
South Dakota	4
Trichinosis:	
South Dakota	2

Tularaemia:	Cases
Alabama	2
Montana	1
Pennsylvania	3
Virginia	3
Typhus fever:	
Alabama	3
Undulant fever:	
Alabama	1
Oklahoma [1]	1
Pennsylvania	7
Washington	1
Vincent's angina:	
Oklahoma [1]	2
Whooping cough:	
Alabama	57
Montana	199
Nevada	10
Oklahoma [1]	24
Pennsylvania	822
South Dakota	85
Virginia	424
Washington	234

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 97 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,400,000. The estimated population of the 90 cities reporting deaths is more than 31,865,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended February 21, 1931, and February 22, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,100	1,317	
97 cities	429	508	887
Measles:			
45 States	12,705	10,141	
97 cities	4,289	2,812	
Meningococcus meningitis:			
46 States	145	236	
97 cities	73	131	
Poliomyelitis:			
46 States	22	17	
Scarlet fever:			
46 States	5,799	5,047	
97 cities	2,194	1,854	1,558
Smallpox:			
46 States	904	1,505	
97 cities	130	150	61
Typhoid fever:			
46 States	145	174	
97 cities	23	33	25
Deaths reported			
Influenza and pneumonia:			
90 cities	1,688	1,181	
Smallpox:			
90 cities	2	0	
Memphis, Tenn	1	0	
Fort Worth, Tex	1	0	

[1] Exclusive of Oklahoma City and Tulsa.

City reports for week ended February 21, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	9	1	0	14	0	0	13	4
New Hampshire:								
Concord	0	1	0	----------	0	0	0	0
Vermont:								
Barre	0	0	0	----------	0	0	0	0
Massachusetts:								
Boston	62	37	17	40	7	90	11	48
Fall River	2	4	0	4	1	0	3	3
Springfield	5	4	0	1	0	1	11	3
Worcester	13	3	3	1	2	6	1	3
Rhode Island:								
Pawtucket	----------	1	----------	----------	----------	----------	----------	----------
Providence	2	8	1	6	4	1	4	21
Connecticut:								
Bridgeport	4	6	1	6	2	0	1	6
Hartford	7	6	2	6	0	52	1	13
New Haven	14	1	0	2	2	74	24	
MIDDLE ATLANTIC								
New York:								
Buffalo	26	13	4	9	4	87	51	43
New York	235	200	91	180	30	676	54	277
Rochester	7	7	1	3	2	0	3	11
Syracuse	20	2	1	----------	0	11	2	4
New Jersey:								
Camden	7	6	3	1	5	90	4	11
Newark	84	17	13	29	2	5	7	18
Trenton	0	2	0	24	1	2	1	10
Pennsylvania:								
Philadelphia	223	68	19	46	27	326	53	75
Pittsburgh	85	19	11	38	21	87	31	70
Reading	8	2	0	----------	2	175	33	8
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	7	8	1	10	11	68	25	22
Cleveland	153	32	8	424	20	6	161	44
Columbus	18	3	2	85	1	4	6	10
Toledo	52	5	8	5	5	1	35	15
Indiana:								
Fort Wayne	3	3	5	----------	1	45	0	4
Indianapolis	49	7	2	----------	1	77	12	27
South Bend	2	1	1	----------	1	1	0	3
Terre Haute	2	0	0	----------	0	1	0	4
Illinois:								
Chicago	86	98	69	77	26	50	61	104
Springfield	11	1	2	2	0	105	8	6

City reports for week ended February 21, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Michigan:								
Detroit	91	46	12	114	28	12	24	64
Flint	11	2	1	72	1	2	6	2
Grand Rapids	5	1	0		2	1	1	0
Wisconsin:								
Kenosha	16	0	0	6	0	1	74	1
Madison	38	0	1	6		1	25	
Milwaukee	120	17	4	13	8	43	449	14
Racine	12	2	1	4	0	3	1	0
Superior	7	0	0		0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	6	0	0	18	2	0	3	4
Minneapolis	62	17	1	6	3	30	118	10
St. Paul	59	7	0		1	6	2	6
Iowa:								
Davenport	2	1	0			2	0	
Des Moines	3	2	0			0	0	
Sioux City	17	0	0			0	8	
Waterloo	4	1	0			0	0	
Missouri:								
Kansas City	48	5	2	6	3	73	3	21
St. Joseph	3	1	2		2	0	0	2
St. Louis	23	42	14	33	11	457	7	
North Dakota:								
Fargo	2	0	0		0	0	4	0
Grand Forks	2	0	3			0	6	
South Dakota:								
Aberdeen	3	0	0			1	0	
Sioux Falls	0	0	0			0	0	
Nebraska:								
Omaha	16	5	9		0	1	17	0
Kansas:								
Topeka	7	1	3	1	1	1	30	1
Wichita	7	2	0		0	0	0	6
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	1	1		0	11	1	3
Maryland:								
Baltimore	135	26	6	126	13	387	63	55
Cumberland	3	0	0	14	2	3	0	4
Frederick	0	0	1		0	0	0	1
District of Columbia:								
Washington	31	18	4	12	4	84	0	35
Virginia:								
Lynchburg	12	1	1		0	1	0	0
Norfolk	17	3	3	40	0	1	0	5
Richmond	0	4	5	1	6	348	1	8
Roanoke	3	1	0		0	1	0	1
West Virginia:								
Charleston	8	0	3	1	0	0	1	1
Wheeling	12	0	0	2	1	1	0	2
North Carolina:								
Raleigh	6	0	0		0	10	0	6
Wilmington	37	0	0	1	0	1	0	3
Winston-Salem	3	1	0	7	0	3	2	5
South Carolina:								
Charleston	4	0	1	332	1	112	1	8
Columbia	3	0	0		3	1	4	16
Greenville	0	1	0		0	0	1	0
Georgia:								
Atlanta	4	4	1	482	14	42	0	15
Brunswick	0	0	0		0	0	7	0
Savannah	3	0	1	104	13	0	12	4
Florida:								
Miami	5	3	0	3	1	0	0	2
Tampa	25	2	0	8	5	110	1	5

City reports for week ended February 21, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	1	0	2	0	15	0	2
Tennessee:								
Memphis	38	3	3		7	28	3	11
Nashville	0	1	3		6	9	0	14
Alabama:								
Birmingham	9	3	2	30	7	135	1	12
Mobile	4	1	0	15	2	0	1	3
Montgomery	12	1	2	22		6	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	5	0	0			0	0	
Little Rock	0	1	1		0	0	0	7
Louisiana:								
New Orleans	9	14	41	23	14	0	0	19
Shreveport	5	0	0		0	0	1	7
Oklahoma:								
Muskogee	6	0	1	15		0	0	
Texas:								
Dallas	34	6	6	4	5	5	40	10
Fort Worth	11	3	2		4	0	0	1
Galveston	2	1	1		1	0	0	3
Houston	0	6	4		1	0	2	11
San Antonio	3	4	2		7	2	2	9
MOUNTAIN								
Montana:								
Billings	3	1	0		3	0	0	6
Great Falls	1	1	0		0	0	0	1
Helena	1	0	0		0	0	0	0
Missoula	0	1	0		0	0	0	2
Idaho:								
Boise	5	0	0		0	0	0	0
Colorado:								
Denver	43	9	4		4	17	13	13
Pueblo	5	2	0		0	161	2	2
New Mexico:								
Albuquerque	13	0	0		0	1	0	1
Arizona:								
Phoenix	8	0	1	1	0	0	0	2
Utah:								
Salt Lake City	8	2	0		0	2	7	4
Nevada:								
Reno	0	0	0	8	0	0	0	1
PACIFIC								
Washington:								
Seattle	31	4	2			2	13	
Spokane	2	2	0			3	0	
Tacoma	8	1	2		0	1	0	3
Oregon:								
Salem	0	0	1			12	22	
California:								
Los Angeles	91	38	16	115	5	108	11	20
Sacramento	38	2	5	23	2	1	2	1
San Francisco	70	15	5	225	4	9	10	5

City reports for week ended February 21, 1931—**Continued**

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases, reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases, reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases, reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	3	13	0	0	0	2	0	0	0	25	31
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	4
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	...
Massachusetts:											
Boston	83	138	0	0	0	10	0	0	0	39	276
Fall River	2	18	0	0	0	2	0	0	0	8	35
Springfield	10	7	0	0	0	1	0	0	0	2	39
Worcester	10	17	0	0	0	2	0	0	0	5	49
Rhode Island:											
Pawtucket	1	...	0	...	...	...	0	...	...	...	...
Providence	12	13	0	0	0	5	0	0	0	10	84
Connecticut:											
Bridgeport	12	6	0	0	0	1	0	0	0	2	43
Hartford	6	6	0	0	0	2	0	0	0	4	47
New Haven	10	2	0	0	0	1	0	0	0	4	42
MIDDLE ATLANTIC											
New York:											
Buffalo	29	24	0	6	0	8	1	0	0	19	178
New York	290	373	0	0	0	94	6	5	1	176	1,731
Rochester	9	91	0	0	0	1	0	0	0	17	94
Syracuse	15	12	0	0	0	1	0	0	0	8	63
New Jersey:											
Camden	7	6	0	0	0	2	0	0	0	2	54
Newark	48	49	0	0	0	8	0	1	0	26	121
Trenton	6	8	0	0	0	7	0	1	0	1	46
Pennsylvania:											
Philadelphia	104	167	0	0	0	54	2	0	1	42	596
Pittsburgh	35	35	0	0	0	11	1	0	0	37	304
Reading	6	0	0	0	0	2	0	0	0	1	26
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	22	34	1	0	0	14	0	0	0	3	160
Cleveland	57	59	0	0	0	25	1	0	0	31	265
Columbus	12	15	2	0	0	2	0	0	0	0	93
Toledo	14	12	1	6	0	4	0	0	0	2	85
Indiana:											
Fort Wayne	4	1	0	1	0	0	0	0	0	1	29
Indianapolis	12	73	7	19	0	6	0	0	0	18	...
South Bend	4	3	1	0	0	1	0	0	0	3	24
Terre Haute	3	5	0	0	0	0	0	0	0	0	26
Illinois:											
Chicago	137	217	3	0	0	49	3	0	0	39	840
Springfield	3	4	0	0	0	0	1	0	0	0	33
Michigan:											
Detroit	120	107	2	2	0	24	0	0	0	87	376
Flint	17	17	0	0	0	1	1	0	0	14	21
Grand Rapids	13	19	0	0	0	0	0	0	0	3	23
Wisconsin:											
Kenosha	3	0	1	0	0	0	0	0	0	0	9
Madison	6	0	0	0	...	...	0	0	...	7	...
Milwaukee	26	19	1	0	0	10	0	0	0	18	144
Racine	5	7	0	0	0	0	0	0	0	7	12
Superior	4	1	0	0	0	0	0	0	0	0	3
WEST NORTH CENTRAL											
Minnesota:											
Duluth	10	0	0	0	0	2	0	0	0	6	29
Minneapolis	52	19	2	0	0	1	0	0	0	11	116
St. Paul	35	4	0	0	0	2	0	2	0	17	73
Iowa:											
Davenport	2	3	1	15	...	...	0	0	...	0	...
Des Moines	12	4	2	13	...	...	0	0	...	0	31
Sioux City	2	18	0	1	...	...	0	0	...	3	...
Waterloo	2	2	1	0	...	...	0	0	...	2	...

City reports for week ended February 21, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases, reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases, reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases, reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—contd.											
Missouri:											
Kansas City	21	16	0	0	0	7	0	0	0	5	130
St. Joseph	3	4	0	0	0	0	0	0	0	0	26
St. Louis	36	183	2	3	0	15	1	0	0	8	351
North Dakota:											
Fargo	2	3	0	0	0	0	0	0	0	0	4
Grand Forks	1	0	0	0			0	0		0	
South Dakota:											
Aberdeen	1	0	0	0			0	0		0	
Sioux Falls	2	0	0	3			0	0		0	8
Nebraska:											
Omaha	5	10	2	16	0	0	0	0	0	1	57
Kansas:											
Topeka	4	0	1	6	0	0	0	0	0	2	20
Wichita	4	1	0	41	0	0	0	0	0	7	29
SOUTH ATLANTIC											
Delaware:											
Wilmington	5	8	0	0	0	0	0	0	0	1	28
Maryland:											
Baltimore	39	40	0	0	0	7	1	0	0	15	259
Cumberalnd	1	2	0	0	0	1	0	0	0	0	17
Frederick	0	3	0	0	0	0	0	0	0	0	5
District of Col.:											
Washington	24	14	1	0	0	9	0	1	0	4	196
Virginia:											
Lynchburg	0	1	0	0	0	0	0	0	0	0	11
Norfolk	2	2	0	0	0	2	0	0	0	9	
Richmond	4	16	0	0	0	4	0	0	0	0	66
Roanoke	0	1	0	0	0	1	0	0	0	0	22
West Virginia:											
Charleston	1	1	0	0	0	0	0	1	1	0	10
Wheeling	2	1	0	0	0	0	0	0	0	0	22
North Carolina:											
Raleigh	1	2	1	0	0	4	0	0	0	7	18
Wilmington	0	0	0	0	0	1	0	0	0	3	11
Winston-Salem	2	2	0	0	0	2	0	0	0	0	12
South Carolina:											
Charleston	0	1	0	0	0	3	0	0	0	0	37
Columbia	0	1	0	0	0	1	0	0	0	0	36
Greenville	0	0	1	0	0	0	0	0	0	0	
Georgia:											
Atlanta	6	57	2	1	0	7	0	0	1	2	114
Brunswick	0	0	0	0	0	0	0	0	0	0	5
Savannah	1	1	0	0	0	1	0	1	0	0	46
Florida:											
Miami	3	1	0	0	0	2	1	0	0	0	31
Tampa	0	3	0	0	0	3	1	2	0	0	41
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	19	0	0	0	0	0	0	0	0	23
Tennessee:											
Memphis	8	53	1	3	1	6	0	0	0	0	90
Nashville	2	7	0	0	0	2	0	0	0	0	59
Alabama:											
Birmingham	2	8	1	0	0	6	1	0	0	4	89
Mobile	0	3	0	0	0	2	0	0	0	0	18
Montgomery	1	1	0	0			0	0		1	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	0	0	0			0	0		0	
Little Rock	2	2	0	2	0	3	0	0	0	0	
Louisiana:											
New Orleans	8	25	0	4	0	15	2	1	0	8	172
Shreveport	0	0	0	8	0	5	0	0	1	0	40
Oklahoma:											
Muskogee	1	3	2	0			0	1		0	

City reports for week ended February 21, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases, reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases, reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases, reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL—contd.											
Texas:											
Dallas	5	8	4	0	0	1	0	0	0	8	60
Fort Worth	4	2	2	17	1	2	0	0	0	0	32
Galveston	0	0	0	0	0	0	0	1	0	0	23
Houston	2	6	3	1	0	3	0	0	0	0	73
San Antonio	2	0	0	0	0	8	0	0	1	0	65
MOUNTAIN											
Montana:											
Billings	0	0	1	0	0	0	0	0	0	0	8
Great Falls	3	10	0	0	0	0	0	0	0	19	6
Helena	0	0	0	5	0	0	0	0	0	0	6
Missoula	0	0	0	0	0	0	0	0	0	7	5
Idaho:											
Boise	1	2	0	0	0	0	0	0	0	0	6
Colorado:											
Denver	14	14	0	0	0	8	0	1	0	24	97
Pueblo	2	1	0	0	0	1	0	0	0	7	9
New Mexico:											
Albuquerque	1	1	0	0	0	7	0	1	0	1	15
Arizona:											
Phoenix	1	0	0	1	0	0	0	0	0	1	-------
Utah:											
Salt Lake City	3	7	1	0	0	0	0	0	0	25	27
Nevada:											
Reno	0	0	1	0	0	0	0	0	0	0	3
PACIFIC											
Washington:											
Seattle	10	7	3	0	-------	-------	1	2	-------	44	-------
Spokane	6	0	9	3	-------	-------	0	1	-------	2	-------
Tacoma	2	9	3	1	0	0	0	0	0	0	37
Oregon:											
Salem	0	0	1	0	-------	-------	0	0	-------	0	-------
California:											
Los Angeles	44	26	3	5	0	25	2	0	0	16	258
Sacramento	2	4	0	0	0	7	0	1	0	8	30
San Francisco	27	2	1	2	0	17	0	2	0	24	183

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Massachusetts:									
Boston	1	0	0	0	0	0	0	1	0
Springfield	1	0	0	0	0	0	0	0	0
Rhode Island:									
Providence	0	0	1	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York: [1]									
New York	12	8	4	1	0	0	1	3	0
New Jersey:									
Newark	0	2	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	6	3	1	1	0	0	0	0	0
Pittsburgh	1	2	0	1	0	0	0	0	0

[1] Rabies (in man): 1 death at New York City.

City reports for week ended February 21, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	1	0	0	0	0	0	0	0
Cleveland	0	0	0	1	0	0	0	0	0
Indiana:									
Indianapolis	6	1	0	0	0	0	0	0	0
Illinois:									
Chicago	0	2	0	0	0	0	1	0	0
Michigan:									
Detroit	8	1	0	0	0	0	0	1	0
Wisconsin:									
Milwaukee	1	0	0	0	0	0	0	0	0
Racine	0	0	1	0	0	0	0	0	0
Superior	1	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	0	0	0	0	0	0	1	0
Minneapolis	1	0	0	0	0	0	0	0	0
Iowa									
Des Moines	1	0	0	0	0	0	0	0	0
Sioux City	[1] 1	0	0	0	0	0	0	0	0
Missouri:									
Kansas City	1	0	0	0	0	0	0	0	0
St. Louis	5	2	1	1	0	0	0	0	0
North Dakota:									
Fargo	1	0	0	0	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	2	0	1	0	0	0	0	0	1
District of Columbia:									
Washington	2	1	0	0	0	0	0	0	0
Virginia:									
Richmond	0	0	0	1	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	2	1	0	0	0
Wilmington	0	0	0	0	3	0	0	0	0
Winston-Salem	0	0	0	0	2	0	0	0	0
South Carolina:									
Charleston	0	0	0	0	2	0	0	0	0
Columbia	0	3	0	0	0	0	0	0	0
Georgia:									
Atlanta	0	1	0	0	0	0	0	0	0
Savannah	0	0	0	0	1	1	0	0	0
Florida:									
Tampa	0	0	0	0	1	0	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	7	5	0	0	0	1	0	0	0
Nashville	2	2	0	0	0	0	0	0	0
Alabama:									
Birmingham	1	1	1	0	1	1	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	1	0	0	0
Louisiana:									
New Orleans	3	1	0	0	4	4	0	0	0
Shreveport	0	0	0	0	0	1	0	0	0
Texas:									
Dallas	0	0	0	0	1	2	0	0	0
Houston	0	0	0	0	0	1	0	0	0
San Antonio	1	0	0	0	0	0	0	0	0
MOUNTAIN									
Colorado:									
Denver	2	0	0	0	0	0	0	0	0
Utah:									
Salt Lake City	2	0	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Tacoma	1	0	0	0	0	0	0	0	0
California:									
Los Angeles	2	2	0	1	0	0	0	1	0
Sacramento	1	0	0	0	0	0	0	0	0

[1] Nonresident.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended February 21, 1931, compared with those for a like period ended February 22, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities January 18 to February 21, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Jan. 24, 1931	Jan. 25, 1930	Jan. 31, 1931	Feb. 1, 1930	Feb. 7, 1931	Feb. 8, 1930	Feb. 14, 1931	Feb. 15, 1930	Feb. 21, 1931	Feb. 22, 1930
98 cities	[2] 79	110	[2] 89	112	[2] 78	92	67	95	[2] 67	91
New England	106	160	106	135	82	119	75	104	[3] 60	109
Middle Atlantic	67	91	68	98	53	92	53	78	64	83
East North Central	94	144	111	139	96	102	85	114	66	101
West North Central	84	83	111	77	99	83	55	107	59	95
South Atlantic	[2] 65	116	[2] 73	116	[2] 75	76	59	102	47	120
East South Central	76	66	70	84	52	72	52	66	58	96
West South Central	81	146	183	216	156	157	118	136	186	80
Mountain	35	35	70	35	78	70	78	62	35	70
Pacific	88	79	45	69	69	36	49	75	59	53

MEASLES CASE RATES

	Jan. 24, 1931	Jan. 25, 1930	Jan. 31, 1931	Feb. 1, 1930	Feb. 7, 1931	Feb. 8, 1930	Feb. 14, 1931	Feb. 15, 1930	Feb. 21, 1931	Feb. 22, 1930
98 cities	[2] 405	220	[2] 418	278	[2] 473	317	521	411	[2] 670	446
New England	522	230	438	341	502	322	534	472	[3] 559	418
Middle Atlantic	251	111	306	145	353	176	397	213	652	254
East North Central	80	135	142	167	151	171	183	251	255	267
West North Central	1,984	467	1,521	424	1,488	610	1,314	810	1,086	775
South Atlantic	[2] 804	172	[2] 1,032	314	[2] 1,294	268	1,817	334	2,202	441
East South Central	698	24	908	54	1,024	72	896	233	1,123	604
West South Central	10	582	17	293	3	648	17	693	24	745
Mountain	757	220	496	396	1,123	405	688	758	1,567	767
Pacific	72	626	110	1,028	112	1,028	168	1,243	243	1,271

SCARLET FEVER CASE RATES

	Jan. 24, 1931	Jan. 25, 1930	Jan. 31, 1931	Feb. 1, 1930	Feb. 7, 1931	Feb. 8, 1930	Feb. 14, 1931	Feb. 15, 1930	Feb. 21, 1931	Feb. 22, 1930
98 cities	[2] 334	288	[2] 337	292	[2] 320	323	348	302	[2] 342	294
New England	575	457	519	346	534	530	683	382	[3] 549	409
Middle Atlantic	314	226	328	239	304	260	321	234	342	242
East North Central	385	375	378	416	331	427	375	434	353	421
West North Central	323	314	386	283	480	370	474	331	497	327
South Atlantic	[2] 343	192	[2] 312	224	[2] 304	222	320	252	304	236
East South Central	483	149	512	143	419	191	378	149	529	149
West South Central	142	98	112	73	88	129	105	108	139	94
Mountain	357	379	322	414	261	361	409	428	296	308
Pacific	119	344	143	306	145	299	123	269	94	202

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1931 and 1930, respectively.

[2] Columbia, S. C., not included.

[3] Pawtucket, R. I., not included.

Summary of weekly reports from cities January 18 to February 21, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

SMALLPOX CASE RATES

	Week ended—									
	Jan. 24, 1931	Jan. 25, 1930	Jan. 31, 1931	Feb. 1, 1930	Feb. 7, 1931	Feb. 8, 1930	Feb. 14, 1931	Feb. 15, 1930	Feb. 21, 1931	Feb. 22, 1930
98 cities	[2] 16	26	[2] 17	31	[2] 23	29	18	26	[3] 20	24
New England	0	5	0	0	0	2	0	7	[3] 0	0
Middle Atlantic	0	1	0	0	2	0	0	0	3	0
East North Central	21	19	25	39	12	34	10	33	13	20
West North Central	77	72	84	48	151	60	84	48	128	93
South Atlantic	[2] 4	2	[2] 0	6	[2] 0	4	0	6	2	2
East South Central	29	0	17	12	29	0	12	24	17	12
West South Central	34	35	51	73	81	94	132	98	51	52
Mountain	9	26	0	62	44	18	0	35	44	18
Pacific	20	152	18	152	24	126	29	89	22	101

TYPHOID FEVER CASE RATES

	Jan. 24, 1931	Jan. 25, 1930	Jan. 31, 1931	Feb. 1, 1930	Feb. 7, 1931	Feb. 8, 1930	Feb. 14, 1931	Feb. 15, 1930	Feb. 21, 1931	Feb. 22, 1930
98 cities	[2] 6	4	[2] 5	5	[2] 4	4	3	6	[3] 4	5
New England	2	0	5	0	2	0	2	2	[3] 0	5
Middle Atlantic	3	5	2	5	1	3	2	6	3	6
East North Central	3	2	1	3	2	5	1	3	0	1
West North Central	10	2	13	4	2	2	2	10	4	2
South Atlantic	[2] 14	8	[2] 8	8	[2] 18	12	0	8	10	14
East South Central	12	18	17	6	6	18	29	18	0	6
West South Central	27	3	14	3	24	7	14	7	7	3
Mountain	17	9	0	9	0	0	0	0	9	9
Pacific	6	2	10	14	0	2	10	4	12	10

INFLUENZA DEATH RATES

	Jan. 24, 1931	Jan. 25, 1930	Jan. 31, 1931	Feb. 1, 1930	Feb. 7, 1931	Feb. 8, 1930	Feb. 14, 1931	Feb. 15, 1930	Feb. 21, 1931	Feb. 22, 1930
91 cities	[2] 52	21	[2] 70	16	[2] 60	14	59	20	[3] 60	19
New England	12	10	34	2	46	5	46	5	[3] 45	17
Middle Atlantic	91	14	101	14	68	10	49	14	42	15
East North Central	18	17	36	13	52	12	56	17	61	16
West North Central	29	18	29	18	21	21	56	12	68	12
South Atlantic	[2] 38	34	[2] 127	12	[2] 129	12	118	32	122	22
East South Central	63	52	76	52	63	32	63	58	139	71
West South Central	83	103	100	82	73	50	159	68	97	68
Mountain	44	9	52	9	52	44	17	35	61	26
Pacific	22	15	14	2	12	7	14	17	26	2

PNEUMONIA DEATH RATES

	Jan. 24, 1931	Jan. 25, 1930	Jan. 31, 1931	Feb. 1, 1930	Feb. 7, 1931	Feb. 8, 1930	Feb. 14, 1931	Feb. 15, 1930	Feb. 21, 1931	Feb. 22, 1930
91 cities	[2] 229	140	[2] 259	164	[2] 231	175	220	171	[3] 216	177
New England	178	138	165	193	286	160	291	193	[3] 264	242
Middle Atlantic	332	128	368	158	293	180	254	191	236	190
East North Central	126	110	176	128	176	138	182	128	187	151
West North Central	171	150	159	162	135	159	124	111	147	153
South Atlantic	[2] 280	214	[2] 345	238	[2] 325	216	373	214	340	222
East South Central	296	194	227	239	176	207	164	220	265	239
West South Central	245	288	203	292	214	270	176	256	228	174
Mountain	157	220	200	229	209	379	183	256	200	247
Pacific	108	77	115	92	72	130	72	107	70	67

[2] Columbia, S. C., not included.

[3] Pawtucket, R. I., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended February 21, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended February 21, 1931, as follows:

Province	Cerebrospinal fever	Dysentery	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia			53	1		
New Brunswick						1
Quebec	2		1			6
Ontario	2		21	1	4	7
Manitoba	1			1		1
Saskatchewan					18	2
Alberta						3
British Columbia		3	1		2	2
Total	5	3	76	3	24	22

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended February 21, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended February 21, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	2	Ophthalmia neonatorum	1
Chicken pox	88	Puerperal septicemia	2
Diphtheria	46	Scarlet fever	95
Erysipelas	5	Tuberculosis	84
German measles	1	Typhoid fever	6
Measles	52	Whooping cough	59
Mumps	23		

CUBA

Provinces—Communicable diseases—Four weeks ended January 17, 1931.—During the four weeks ended January 17, 1931, cases of certain communicable diseases were reported in the provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer			1	1			2
Chicken pox		12	9	30	4	7	62
Diphtheria	1	24	3	2	1	1	32
Malaria	1	4			7	66	78
Measles		1		10			11
Paratyphoid fever			2			2	4
Scarlet fever		1		1			2
Tetanus (infantile)				1			1
Typhoid fever	3	18	2	11	4	16	54

Habana—Communicable diseases—January, 1931.—During the month of January, 1931, certain communicable diseases were reported in the city of Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	12		Measles	7	
Diphtheria	22	3	Rabies	1	1
Filariasis	1		Scarlet fever	1	
Leprosy	2	1	Tuberculosis	29	6
Malaria [1]	2		Typhoid fever [1]	7	2

[1] Many of these cases are from the island, outside of Habana.

DENMARK

Communicable diseases—December, 1930.—During the month of December, 1930, cases of certain communicable diseases were reported in Denmark as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	4	Paratyphoid fever	3
Chicken pox	31	Poliomyelitis	4
Diphtheria and croup	499	Puerperal fever	21
Erysipelas	297	Scabies	844
German measles	3	Scarlet fever	170
Influenza	5,907	Tetanus	4
Lethargic encephalitis	6	Typhoid fever	5
Measles	1,400	Undulant fever (Bac. abort. Bang)	54
Mumps	393	Whooping cough	2,109

PORTO RICO

San Juan—Communicable diseases—Five weeks ended January 31, 1931.—During the five weeks ended January 31, 1931, cases of certain communicable diseases were reported in San Juan, Porto Rico, as follows:

Disease	Cases	Disease	Cases
Diphtheria	6	Measles	4
Influenza	6	Typhoid fever	2
Leprosy	1	Whooping cough	36
Malaria	42		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Oct 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Week ended— December, 1930		January, 1931					February, 1931			
						20	27	3	10	17	24	31	7	14	21	28
China:																
Amoy	C	2														
	D	2														
Canton	C		1	1												
Shanghai	C	34	38	2												
	D	3	4													
Shensi Province	C	P														
Swatow	C	2														
Tientsin	C	1														
India	C	51, 551	36, 529	18, 944	11, 112	1, 745	3, 258	2, 779								
	D	23, 959	17, 635	9, 782	5, 933	918	1, 724	1, 550								
Bassein	C	1														
Bombay	C	1	16	19	13					20	1					
	D	2	11	17	7					6	3					
Calcutta	C	27	24	33	22	9	7	6	6	36	29	24	32	27		
	D	12	15	16	16	6	4	5	5	25	19	19	23	22		
Madras	C		2	1		14	44	70	73	47	36	16				
	D		2			8	12	19	28	21	11	7	8	5		
Negapatam	D											1	2	1		
Rangoon	C	2	1				1			1						
	D	1	1				1			1						
Tuticorin	C		1	1	5	1									1	
	D		1	1												
India (French):																
Chandernagor	C	1	3	1	1		1	1								
	D		1			1	1	1								
Pondicherry	C		1	1	4	3	9	2	17	9	4	3	3	10	20	
	D		1		4	3	3	1	14	3	3	3	2	10	9	
India (Portuguese)	C	1		14		1										
	D	1		9												
Indo-China (see also table below):																
Phnompenh	C		2	1	2						1	2	1			
	D				2							2				
Saigon and Cholon	C		2	1	3	1		4	4	4	1		1			
	D				1			2	2	2	1					

Philippine Islands: [1]																
Ports—																
Cebu	C	2														
	D	2														
Iloilo	C	10	1		1			1				2				
	D	14	4		3			1				2				
Manila	C	43	5													
	D	12	1													
Provinces—																
Antique	C	47	40													
	D	34	18													
Bohol	C	49														
	D	20														
Bulacan	C	4	2													
	D	2	1													
Capiz	C	1										3	56	69	54	28
	D											2	45	55	39	23
Cebu	C	25														
	D	11														
Iloilo	C	738	50	30	45	7	5	13	3	41	41	36	57	27	42	10
	D	151	40	23	27	6	4	10	2	9	27	25	49	21	22	11
Negros, Occidental	C	122	28	56	163	28	19	33	40	19	32	33	6	1	1	2
	D	91	20	41	123	22	16	26	33	15	17	19	5	1	1	2
Negros, Oriental	C												1			
	D												1			
Pampanga	C	1														
Samar	C	4	7	16	8	2	1	12	2							
	D	2	7	12	8	1		7	1							
Sorsogon	C			5												
	D			4												
Surigao	C	1	(2)													
	D	2														
Siam	C		4	4	6	2		2	2	2					1	
	D		1	4	6	2		2	2	1						
Bangkok	C		3	3	4	2	1	1	2	2		1		1		
	D		2	2	4	2	1		1	1						
On vessel: S. S. Malwa from Shanghai	D	1														

Place		June, 1930	July, 1930	August, 1930	September, 1930			October, 1930			November, 1930			Dec. 1-10, 1930
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30	
Indo-China (French) (see also table above):														
Annam [3]	C	16	1	3										
Cambodia [3]	C	144	43	59	23	13	2	16		6		1		28
Cochin-China [3]	C	273	46	27	9	6	18	14	6	8		5		8

[1] Figures for cholera in the Philippine Islands are subject to correction.
[2] During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, P. I.
[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Week ended— December, 1930		January, 1931					February, 1931			
						20	27	3	10	17	24	31	7	14	21	28
Algeria:																
Algiers	C	11	6	11	2	1				1		1				
	D			3												
Bone	C											1				
Constantine, vicinity of	C			1			3	1	46			1		1		
	D											1				
Oran	C	10	10	2												
	D	1	3	1												
Plague-infected rats		10	6	1												
Philippeville	C	1	3	2					1							
	D		1						1							
Argentina:																
Cordoba Province	C										1				2	
Entre Rios Province—Diamante	C															2
Jujuy Province—Palpala	C											1			1	
Santa Fe	C														2	
Belgian Congo	C	5		1	1											
	D	3		1	1											
British East Africa (see also table below):																
Tanganyika	C				3	2										
	D				3	2										
Uganda	C	202	165	171	111	18	17	14	18							
	D	191	164	168	112	18	17	14	18							
Ceylon: Colombo	C	2	3	1	9	4		4	1	1	1	1	5	6		
	D	3	3	1	8	4		4	1		1	1	4	7		
Plague-infected rats				1	2							1	1	1		
China:																
Manchuria—Tungliau and Nungan	C	29	1													
Shensi	C	P		1												
Dutch East Indies:																
Batavia and West Java	C	79	107	143	208	54	56	68								
	D	76	103	146	206	54	57	66								
Plague-infected rats		3														
Java and Madura	D	260	335	501	557	159	143	173	140	142	102					

Egypt:																
Alexandria	C	10	9	7	4	1	1		1				1			
	D	8	6	7	1											
Plague-infected rats					3	1					1				1	
Assiout	C			3	9	5	1		1	2	19	2	3	9		17
	D			1	1				1	2	2	2		4		3
Aswan	C				3											
Beni-Suef	C									1						
Deirout	C										19	2				
	D										2	2				
Gharbieh	C											1				
	D											1				
Girga	C	1				3	1	3					1			
	D						1	1					1			
Manfalut	C								23	5	21	4		11		2
	D								5	2	3	1		4		1
Minieh	C				1						1	1				
Port Said	C			2												
France: Marseille	C	5	4	4												
Greece (see also table below): Pyrgos	C		2													
India	C	2,497	2,371	2,721	3,259	987	794	841								
	D	1,132	1,068	1,497	1,856	548	476	582								
Bassein	C	2		1					2	1		1	2			
	D	3							1	1			2	1		
Bombay	C	1	2	1							1			1		
	D	1	2	1							1			1		
Plague-infected rats		47	64	30	32	10	9	6	13	10	6	9	9	14		
Madras Presidency	C	127	196	185	148	30	94	96								
	D	57	110	124	78	14	71	69								
Rangoon	C	10	2	2			1	1			2					
	D	9	2	1			1				2					
Plague-infected rats		8	1	1	4	1	1			2	1	1				
India (Portuguese)	D			3												
Indo-China (see also table below):																
Pnompenh	C	3	2		6	1				1	3	2	1			
	D		3	1	6	1				1	3	2	1			
Saigon and Cholon	C	1	1													
Iraq: Baghdad	C		1	P	4						2	3				1
	D		1		2						2	2				
Madagascar (see also table below): Tamatave	C	1	1	5	4		2									
	D		1	3	3											
Morocco	C			5		9		10		13						
	D					4		4		4						
Nigeria: Lagos	C	6	5	38	9	2	1	1	1				1			
	D	6	5	5	9	2	1	1	1				1			
Plague-infected rats		10	11	13	5	4		1								

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Week ended— December, 1930: 20	December, 1930: 27	January, 1931: 3	January, 1931: 10	January, 1931: 17	January, 1931: 24	January, 1931: 31	February, 1931: 7	February, 1931: 14	February, 1931: 21	February, 1931: 28
Peru (see table below).																
Senegal (see table below).																
Siam	C	3	1	6									4			
	D	2		5									2			
Bangkok	C			1	1		1	2			4	4			2	
	D			1	1		1	2			4	3	1		1	
Nagara Rajsima	C	1	1	1	11	4	3	4	6	3	2	1	3	7		
	D	1	1	1	9	3	3	1	3	2	3	1	4	6		
Syria: Beirut	C	5		6					1				1			
Tripolitania	C			1	13					2	2	1	3		1	
	D				1					2			1			
Tunisia: Tunis	C			1	P	12			1	1					9	
	D														7	
Union of Socialist Soviet Republics: Transcaucasia-Karabakh	C										6					
Union of South Africa:																
Cape Province	C	1		1	P											
	D	1														
Orange Free State	C	2						2								
	D	2						2								
On vessel: S. S. Marionga de Thermiotis at Avonmouth	C						1									

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
British East Africa (see also table above):							
Kenya	C	97	87	53	58	62	50
Greece (see also table above)	C				2		
Indo-China (see also table above)	C	1	2	5	2	5	1
Madagascar (see also table above):							
Ambositra Province	C				4	16	
	D				4	16	
Antisirabe Province	C	24	11	21	3	10	
	D	24	11	21	3	10	
Miarinarivo Province	C	1	2	7	18	8	
	D	1	2	7	18	8	
Moramanga Province	C		27	18	20	8	
	D		27	17	20	8	
Tananarive Province	C	28	39	79	125		
	D	28	38	79	116		

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
Peru	C	8	21	10	42	34	
	D	1	8	2	20	14	
Senegal:							
Baol [1]	C	62	79	48	53		
	D	48	20	23	35	4	
Dakar [1]	C	140	108	3			
	D	122	90	8			
Louga [1]	C	138	75	61	37	10	
	D	103	33	30	25	3	
Thies [1]	C	54	34	12	24	27	2
	D	30	20	4	15	23	1
Tivaouane [1]	C	119	110	20	53	31	2
	D	70	54	14	31	25	1

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Week ended— December, 1930		January, 1931					February, 1931			
						20	27	3	10	17	24	31	7	14	21	28
Algeria:																
Algiers	C					1							1			
Bone	C											1				
Constantine	C			1												
Oran	C				3											
Arabia: Aden	C												1			
Brazil:																
Porto Alegre (alastrim)	C	1	26	36	28											
Rio de Janeiro	C			2												
British East Africa (see also table below): Tanganyika	C	522	95	17	385	23	1	57	3		25					
	D	60	6	1	36	1		3			1					
British South Africa: Southern Rhodesia	C	1	153	95	18				18							
	D				3											
Canada:																
Alberta	C	1	22		1			19			7			1		
British Columbia—Vancouver	C	2	2	3	1			1	2				2	1		
Manitoba	C	1										1				
Winnipeg	C								1							1
Nova Scotia	C											1				
Ontario	C	10	19	59	23	1		8	8	10	3	32	4	10		
Kingston	C						2	4		1						
North Bay	C						1		1					1		
Ottawa	C	5		37	12			2		1	1	1			1	
Sault Ste. Marie	C								1	11	8	5	6			2
Toronto	C	1			4											
Quebec	C				2						2					
Saskatchewan	C	1	3	2	18					7	6	5	20	17		
China:																
Canton	C													2		
Changking	C	P	P	P	P	2										
Foochow	C	P	P	P	P				P		P					
Hong Kong	C						1				1			2	5	

Manchuria—																
Harbin	C			1												
Kwantung—Dairen	C				4	1										
	D				1											
Nanking	C	P	P	P	P	P	P	P	P	P		P				
Shanghai—																
Foreigners only	C	18	1	2	8	4	2	6	2	1	1	6	4	4		
Including natives	D	2		1	4	5	1	1	4	2	4	4	3	5		
Swatow	D	2	4	3	3		2	1	2	1	1	3	2			
Tientsin	C		1	1	2					1						
Chosen (see table below).																
Colombia: Cali	D		2		1											
Dutch East Indies:																
Java—Batavia and West Java	C	11	14	26	6	2		2					1			
	D	4	4	4	2		1	1					1			
Sanggi Islands	C	14		29												
	D	3		3												
France (see table below).																
Greece (see table below).																
Great Britain:																
England and Wales	C	341	325	372	508	138	135	164	228	187	272	286	213	221		
Bradford	C	3	1	1	1			1			1		3			
Cardiff	C		1													
Leeds	C		1	2				2								
London	C	130	29	172	184	27	38	48	48	45	47	33	24	23		
London and Great Towns	C	223	52	2[illegible]6	433	105	131	162	162	154	198	194	147	150		
	D	1		1	1											
Sheffield	C										1	1	1			
Stoke-on-Trent	C	1		1							1					
Honduras:																
Naco	C	5														
Puerto Castilla	C								4	7	1		3	3		
India	C	3,131	2,322	2,412	3,627	942	1,169	1,278								
	D	690	572	606	874	262	281	327								
Bombay	C	6	1		1			1	1	2	2	2	1			
	D	5			1			1	1			1				
Calcutta	C	14	12	9	18	10	19	15	15	28	28	40	47	35		
	D	9	11	7	11	7	13	10	10	16	22	29	33	26		
Cochin	C	3	12	25	22	6	7		2	5	6	8	10	19		
	D	1	1	3	4				1					1		
Karachi	C	4			3							2	1			
	D	2			1							1	1			
Madras	C	34	19	9	20		1		3	4	7	3	2	4		
	D	6	8	2	3											
Moulmein	C										2					
	D	1														
Negapatam	C	9	14	9	6											
Rangoon	C		2	1	1									2		
	D			1												
Tuticorin	C		1													
Vizagapatam	C		1										1			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Week ended— December, 1930: 20	27	January, 1931: 3	10	17	24	31	February, 1931: 7	14	21	28
India (French):																
Chandernagor	C	3	3	3			5			3	2		3	2		
	D	2	1	1			2	1		1						
Karikal	C	5	1					1	2	1	2			2		
	D	2	1						2		2			2		
Pondicherry Province	C	35	38	11	19	8	8	7	11	16	8	1				
	D	33	36	11	17	7	8	7	10	16	8	1				
India (Portuguese)	C	4				3			1	1						
Indo-China (see also table below):																
Pnompenh	C		2		1		2						1			
	D				1								1			
Saigon and Cholon	C	1		2	2					3	1		2			
	D	1		2	2					2			2			
Iraq:																
Baghdad	C	1	2													
Mosul Liwa	C		69	6	16				1		2		1		5	
	D		27		2										1	
Ivory Coast (see table below).																
Mexico (see also table below):																
Jalisco (State) Guadalajara	D		3	3	3						1					
Juarez	D		1	1												
Mexico City and surrounding territory	C	12	13	9	6	1	5									
	D	5	3	2	6	2	1									
Vera Cruz	C			1										1		
Morocco (see table below).																
Nicaragua: Porto Cabezas	C					2										
Poland	C			8	3			23	2							
Portugal: Lisbon	C	27	16	20	37	21	17		34	27	31	15	39			
Siam	C		1											1	1	
Somaliland, British: Boales	C		1	1	1											
	D		1						1							
Spain	C	5		51	67	19	31	18				10				

Straits Settlements	C	6	5	10	17	3	------	2	1	3	1	2	1	------	------	------
	D	1	1	2	7	2	------	1	------	------	------	1	------	------	------	------
Sudan (Anglo-Egyptian)	C	128	82	5	50	------	47	------	17	1	7	------	3	1	1	44
	D	52	7	1	5	------	5	------	1	------	7	------	------	------	------	6
Sudan (French) (see table below).																
Switzerland: Berne Canton	C	------	1	------	------	------	------	------	------	------	------	------	------	------	------	------
Syria (see table below).																
Tunisia: Tunis	C	------	2	------	------	------	------	13	4	6	1	1	------	------	------	------
Turkey (see table below).																
Union of South Africa:																
Cape Province	C	P	P	P	P	P	P	P	P	------	------	------	------	------	------	------
Orange Free State	C	------	------	2	P	------	------	------	------	------	------	------	------	------	------	------
Transvaal	C	P	P	P	P	P	P	P	------	P	------	------	------	------	------	------
Upper Volta	C	------	------	------	6	------	------	------	4	------	------	------	------	------	------	------
	D	------	------	------	------	------	------	------	2	------	------	------	------	------	------	------
On vessel:																
S. S. Clan Mactoggart at Suez	C	------	------	------	------	------	------	------	------	------	------	------	------	2	------	------
S. S. Muncaster Castle at Manila from Hong Kong	C	------	------	------	------	------	1	------	------	------	------	------	------	------	------	------
S. S. Matheran at Suez from Calcutta	C	------	------	------	------	------	------	------	------	------	1	------	------	------	------	------
S. S. Clan Buchanan at Suez	C	------	------	------	------	------	------	------	------	------	------	------	------	------	------	2

Place		July, 1930	August, 1930	September, 1930	October, 1930	November, 1930			December, 1930			January, 1931		
						1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31
Indo-China (see also table above)	C	238	93	192	258	------	86	------	38	9	14	------	------	46
Ivory Coast	C	------	------	------	4	------	2	------	9	------	------	------	------	------
Sudan (French)	C	34	39	P	17	------	------	------	43	------	96	------	------	------
	D	------	3	------	2	------	------	------	16	------	4	------	------	------
Syria: Beirut	C	2	1	------	------	------	------	------	------	------	------	------	1	------

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
British East Africa (see also table above):							
Kenya	C	186	------	424	------	653	------
Chosen	C	65	35	3	22	------	------
	D	21	15	5	6	------	------
France	C	1	------	------	------	------	------

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
Greece	C	1	6	------	------	------	4
Mexico: (see also table above)	D	659	718	822	893	------	1
Morocco	C	3	8	4	4	20	------
Turkey	C	51	21	19	74	------	------
	D	18	4	2	1	------	------

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Aug. 24-Sept 20, 1930	Sept 21-Oct. 18, 1930	Oct. 19-Nov. 15, 1930	Week ended— November, 1930: 22	November, 1930: 29	December, 1930: 6	December, 1930: 13	December, 1930: 20	December, 1930: 27	January, 1931: 3	January, 1931: 10	January, 1931: 17	January, 1931: 24	January, 1931: 31	February, 1931: 7	February, 1931: 14
Algeria:																	
Algiers	C	3		1		2											
Constantine Department	C		2	1		1		1			3	3		6	6	19	
Oran	C	1	3			3		2						1	2		
Bulgaria	C	4	6	3	1	1	3	6	3				9	2	1		
	D								1								
China:																	
Canton	C													2			
Manchuria—Harbin (see also table below)	C	2	1				1										
Shanghai	C													2			
Chosen (see table below).																	
Czechoslovakia (see table below).																	
Egypt:																	
Alexandria	C	3	1	2	1	1											
	D	1		2													
Beheira Province	C	1							1								
	D								1								
Cairo	C	2						1	1							1	
Port Said	C	1	1	2										1			
Great Britain: Scotland	C															1	
Glasgow	C														2		
	D														1		
Guatemala.[1]																	
Latvia (see table below).																	
Lithuania (see table below).																	
Mexico (see also table below):																	
Durango	D	1	2												1		
Mexico City, including municipalities in Federal District	C	7	8	11	1	1		12	5	2	4	1	13	12	6		
	D	2	2	4	2	3		2	4	1	3	2	8	9	9		
San Luis Potosi	D						1	1									2
Morocco	C	2		3	1				8						1	2	
	D		1														
Palestine	C	3	3	3	1	6			1	1		2	1	1			3

Poland[1]	C	23	22	37	12		21	9	18	6	28	11	19	21	16	50	
	D	1	2		1		3	3	3				2	1	4	1	
Portugal: Oporto	C		2	4	2	2	2							1			
Rumania	C	4	14	41	19		15		20	34		59	54	43			
	D			2	1		2		1	2		2	1	7			
Spain	C	1	2	4			1										
	D	1	2				1										
Tunisia	C	6	12		5		23							7	4	5	
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P					
Municipality of East London	C	2	1	1	1				P		2	1			1		
Natal	C	P	2	P								P	P				
Orange Free State	C	P		P					P	P		P	P				
Transvaal	C	P	P	P	P	P			P	P	P	P					
Yugoslavia (see table below).																	

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
China: Harbin (see also table above)	C	14	[illegible]		3		
Chosen: Seoul	C	3	2	1	7	1	1
Czechoslovakia	C		1			16	16
Greece: Athens	C	6	6	4	4	4	10
Latvia	C	3	1	2			
Lithuania	C	18	7	24	1	5	1
	D		1	2		1	
Mexico (see also table above)	D	41	26	47	47		
Turkey	C	7	11		28	3	2
Yugoslavia	C		2		2	2	
	D		1		1		

YELLOW FEVER

	Cases	Deaths
Brazil:		
Barbalha	1	1
Rio de Janeiro State—		
Cambucy—		
Jan. 1–25, 1931	3	3
Feb. 1–7, 1931	1	1
Friburgo (imported), Jan. 25–30, 1931	1	
Brazil: Continued.		
Rio de Janeiro State—continued.		
Padua—		
Jan. 18–24, 1931	1	1
Feb 1–7, 1931	1	1
Para, July 29, 1930		1
Gold Coast:		
July 10, 1930	1	
Albosso, Aug. 4, 1930		1
Nigeria: Lagos, July 12, 1930 (probably laboratory infection)	1	

[1] The Director General of Public Health of Guatemala reports an unusual outbreak of typhus fever in a small village in Guatemala.

X

UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

ISSUED WEEKLY

BY THE UNITED STATES PUBLIC HEALTH SERVICE

VOLUME 46 :: :: :: NUMBER 14

APRIL 3 - - - - 1931

SPECIAL ARTICLES

Decrease in Influenza in the United States and Europe

Sickness Among Industrial Employees, Second Half of 1930

Report of the Committee on Milk Production and Control

UNITED STATES
GOVERNMENT PRINTING OFFICE
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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of public health.

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PUBLIC HEALTH REPORTS

VOL. 46 APRIL 3, 1931 NO. 14

THE PREVALENCE OF INFLUENZA

Only 4,655 cases of influenza were reported to the Public Health Service by State health officers for the week ended March 21, 1931. This is the smallest number reported for any week since January 17. The disease this year has been characterized by somewhat irregular progress from east to west, short duration in most localities, few complications, and a low death rate as compared with epidemic years since 1917.

Reports from Great Britain and European countries show a general decrease in the prevalence of influenza, although the latest available information includes reports of increases in some localities.

SICKNESS AMONG INDUSTRIAL EMPLOYEES IN THE SECOND HALF OF 1930 [1]

A favorable health record among industrial workers during the second half of 1930 is indicated from reports of a group of industrial sick-benefit associations covering about 135,000 male industrial employees. The record is based on the frequency of claims for sickness and nonindustrial accident benefits covering cases causing disability for 8 consecutive calendar days or longer. A low rate of cases causing more than one week's disability was recorded also for male employees of the same industrial establishments in the first and second quarters of 1930.[2]

Although available morbidity rates are based on sample data that may be too small to be representative, favorable mortality rates in 1930 suggest that the relatively low incidence rates of disabling sickness among the men included in the record under discussion may have prevailed generally. The death rate among about 19 million industrial policyholders of the Metropolitan Life Insurance Co. is reported as being about 1 per cent less than in 1927, when the previous minimum death rate was established.[3] Among the sixty-odd thousand members of the Relief Plan of the Bethlehem Steel Corporation, both mortality and morbidity in 1930 were substantially below the

[1] From the Office of Industrial Hygiene and Sanitation, U. S. Public Health Service.

[2] *Cf.* Sickness among industrial employees in the first half of 1930, Public Health Reports, Vol. 45, No. 43, October 24, 1930. (Reprint No. 1420.)

[3] Statistical Bulletin, Metropolitan Life Insurance Co., Vol. 12, No. 1, January, 1931, p. 1.

average during prior years.[4] The data available seem to indicate that the year as a whole was marked by relatively good health among the wage-earning population of the United States.

That the favorable sickness record was due largely to the absence of serious epidemics of a respiratory nature is indicated by the non-respiratory disease rate, which differed little in 1930 from that of 1929 and 1928. In contrast, the incidence of influenza or grippe was much lower in three of the four quarters of 1930 than in the corresponding periods of the two immediately preceding years. The frequency of cases of pneumonia also was relatively low throughout the year 1930. The death rate from influenza among industrial policyholders of the Metropolitan Life Insurance Co. was lower in 1930 than for any other year, with a single exception, since the great pandemic of 1918–19. The mortality rate for influenza and pneumonia combined was the smallest ever experienced among these millions of insured persons, as was the 1930 rate for pneumonia separately.[5] It will be recalled that the recent mild wave of influenza did not get under way until January, 1931.

An unusually low rate was established not only for influenza and pneumonia, especially in the second half of 1930, but also for other diseases of the respiratory system. The rates for bronchitis (acute and chronic) and for pharyngitis, tonsillitis, and other diseases of the pharynx were unusually low as may be seen from the comparisons afforded in Table 1. The diseases included in the category "other respiratory diseases" were also conspicuous by their infrequency. The low rate of new cases of tuberculosis of the respiratory system shown in the fourth quarter of 1930 may be revised upward if later reports change to a diagnosis of tuberculosis certain cases which at present are classified among the less serious respiratory diseases. There is little likelihood, however, that the indicated rate of new cases of tuberculosis in the third quarter of 1930 will be appreciably altered. In general, it may be said that all of the numerically important respiratory diseases appear to have occurred at below-average incidence in this industrial group during the last six months of 1930.

In spite of unusually hot weather in the third quarter of 1930 (July, August, September), the frequency of 8-day and longer cases of diseases of the stomach, diarrhea, and enteritis was not abnormally high. The only nonrespiratory disease group shown in Table 1 which exhibited signs of increased prevalence in the summer of 1930 was the epidemic and endemic disease group, exclusive of influenza. This group covers titles numbered 1 to 10 and 12 to 25 in the International List of the Causes of Death, 1920 revision.

As has been indicated, the morbidity rates presented in Table 1 cover a very small sample of the wage-earning population of the

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[4] Fifth Annual Report of Relief Plan of Bethlehem Steel Corporation and Subsidiary Companies, p. 8.
[5] Statistical Bulletin, Metropolitan Life Insurance Co., Vol. 12, No. 1, January, 1931, p. 4.

country. However, comparisons of recent with earlier periods were made among men in the same industrial establishments, so that the same population, as near as it was possible to obtain, was under observation.

The establishments included were (with one exception) located north of the Ohio and Potomac Rivers and east of the Mississippi. The sickness rates for female employees are not presented on account of paucity of data.

TABLE 1.—*Frequency of disability lasting 8 calendar days or longer in the third and fourth quarters of 1930 as compared with the corresponding quarters of 1929 and 1928—Male morbidity experience of 17 industrial establishments which reported their cases to the United States Public Health Service during all three years* [1]

Diseases Causing Disability (Numbers in parentheses are disease title numbers from the International List of Causes of Death, 3d revision, Paris, 1920)	Annual number of disabilities per 1,000 men in—		
	1930	1929	1928
THIRD QUARTER (JULY, AUGUST, SEPTEMBER)			
Sickness and nonindustrial injuries	78.2	88.2	84.1
Nonindustrial injuries	12.5	13.3	11.1
Sickness	65.7	74.9	73.0
Respiratory diseases	17.2	23.3	25.0
Influenza and grippe (11)	4.2	6.8	9.1
Bronchitis, acute and chronic (99)	2.9	3.4	3.8
Pneumonia, all forms (100, 101)	1.2	1.5	1.2
Diseases of the pharynx and tonsils (109)	4.5	5.8	5.1
Tuberculosis of the respiratory system (31)	.9	1.1	.9
Other respiratory diseases (97, 98, 102–107)	3.5	4.7	4.9
Nonrespiratory diseases	48.5	51.6	48.0
Diseases of the stomach, diarrhea, and enteritis (111,112, 114)	6.8	6.9	5.7
Other diseases of the digestive system (108, 110, 115–127)	8.2	10.1	8.9
Diseases of the circulatory and genito-urinary systems and annexa (87–96, 128–136)	7.1	8.2	6.5
Diseases of the nervous system (70–84)	5.0	5.0	4.7
Diseases of the skin (151–154)	4.6	4.8	5.4
Epidemic and endemic diseases except influenza (1–10, 12–25)	1.4	1.2	.9
Rheumatism—acute and chronic (51, 52)	4.5	4.4	6.0
Lumbago and other diseases of the organs of locomotion (158)	3.5	3.7	3.4
Ill-defined and unknown causes (205)	2.3	2.0	1.8
All other diseases (26–30, 32–37, 41–50, 53–69, 85, 86, 155–157, 159, 164)	5.1	5.3	4.7
Average number of males covered in the records	137,730	143,344	116,985
FOURTH QUARTER (OCTOBER, NOVEMBER, DECEMBER)			
Sickness and nonindustrial injuries	84.5	96.0	130.0
Nonindustrial injuries	12.2	12.7	11.4
Sickness	72.3	83.3	118.6
Respiratory diseases	26.0	37.4	69.2
Influenza and grippe (11)	10.7	15.1	45.4
Bronchitis, acute and chronic (99)	4.2	6.5	6.7
Pneumonia, all forms (100,101)	2.0	2.9	3.9
Diseases of the pharynx and tonsils (109)	4.1	6.9	5.9
Tuberculosis of the respiratory system (31)	.7	1.0	.9
Other respiratory diseases (97, 98, 102–107)	4.3	5.0	6.4
Nonrespiratory diseases	46.3	45.9	49.4
Diseases of the stomach, diarrhea, and enteritis (111,112,114)	5.5	5.0	6.1
Other diseases of the digestive system (108, 110, 115–127)	8.1	7.3	7.2
Diseases of the circulatory and genito-urinary systems and annexa (87–96, 128–136)	7.8	7.3	8.0
Diseases of the nervous system (70–84)	4.3	5.4	5.3
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Ill-defined and unknown causes (205)	1.6	1.7	2.0
All other diseases (26–30, 32–37, 41–50, 53–69, 85, 86, 155–157, 159, 164)	5.0	4.6	4.9
Average number of males covered in the records	131,673	140,007	119,452

[1] Except that the rate for 1928 covers 16 of the 17 establishments included in 1929 and 1930.

COURT DECISION RELATING TO PUBLIC HEALTH

Injunction to restrain operation of municipal sewage disposal plant denied.—(Texas Commission of Appeals; city of Wylie et al. *v.* Stone, 34 S. W. (2d) 842; decided Feb. 4, 1931.) The plaintiff in the trial court was the owner of a tract of land which was located near the city of Wylie and which was used by the plaintiff as a homestead for himself and family. Adjacent to this land was a tract owned by the city of Wylie and on which was maintained a municipal sewage disposal plant. On the ground that such disposal plant constituted a nuisance which interfered with the use and comfortable enjoyment of his premises, the plaintiff brought suit solely to restrain the city from the further operation of the plant at the place where it was located. The jury found that the operation of the plant constituted a nuisance which diminished the value of plaintiff's premises to the extent of $5,000, that the removal of the plant by the city would entail a loss upon it of $8,000, and that there was another more suitable location for such a plant where injuries similar to those suffered by the plaintiff would not be inflicted upon others. Upon these findings the trial court decreed that the disposal plant be abated as a nuisance, and the city was restrained from using or operating the same at the place where located after six months from the date of final judgment. The court of civil appeals reversed the judgment of the trial court, and the plaintiff took the case to the commission of appeals.

By article 1109b of the Revised Statutes, 1925, cities and towns of less than 5,000 inhabitants were given the power to "appropriate private property for public purposes whenever the governing authorities shall deem it necessary and to take any private property within or without the city limits for any of the following purposes, to wit: * * * sewer systems, storm sewers, sewage disposal plants, drains, filtering beds and emptying grounds for sewer systems." The city challenged the power of the trial court to substitute its judgment as to a proper location for a disposal plant for that of the city's governing body, in the absence of pleading and proof that the city officials in locating the plant acted arbitrarily or capriciously. The commission of appeals held that the above-quoted statute vested a discretionary power in the governing body of the city as to the location of the disposal plant, and that, such being the case, the courts were not authorized to interfere with the exercise of the discretion thus granted in the absence of pleading and proof, which was wanting in the instant case, that the action of the city officials in selecting the particular location was not the exercise of a fair discretion but was the result of an arbitrary or capricious choice upon their part.

The commission of appeals also held that article 1108 of the Revised Statutes, 1925, which authorized a city to purchase and own lands

for the purpose of operating a sewerage system, should be construed in connection with article 1109b, as both related to the same subject matter. The commission stated that "the authorization in article 1109b to 'take any private property' when 'the governing authorities shall deem it necessary' should be construed to include that taken either by purchase or through condemnation proceedings. * * * No sound reason can be advanced as to why the legislature would vest a discretion in the city authorities as to the location of a sewerage plant where land was acquired by condemnation and deny such privilege where litigation had been avoided by acquiring the land by private purchase."

The judgment of the court of civil appeals was affirmed.

PRELIMINARY REPORT OF COMMITTEE ON MILK PRODUCTION AND CONTROL

White House Conference on Child Health and Protection

SECTION II: PUBLIC HEALTH SERVICE AND ADMINISTRATION

Surg. Gen. Hugh S. Cumming, *Chairman*

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H. A. Whittaker, *Chairman*

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[1] Deceased.

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I. Communicable diseases:
- S. J. Crumbine, M. D., *chairman.*
- V. A. Moore, D. V. M., M. D.
- Lucius P. Brown.

II. Public health supervision:
- Leslie C. Frank, *chairman.*
- Charles O. H. Laughinghouse, M. D.[1]
- Frank C. Wilson.

III. Nutritional aspects:
- E. V. McCollum, D. Sc., Ph. D., *chairman.*
- F. W. Schultz, M. D.
- James A. Tobey, D. P. H.

IV. Economic aspects:
- O. E. Reed, *chairman.*
- C. E. Gray.
- Frederic W. Howe.

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[1] Deceased.

PRELIMINARY REPORT

Your committee has directed its efforts toward collecting information on milk that would be of value to the conference in promoting and protecting the health and welfare of the child.

The different phases of milk selected for study were (1) its relation to communicable diseases, (2) its public-health supervision, (3) its nutritional aspect, and (4) its economic aspect. The committee, in order to facilitate its work, was divided into four subcommittees, each of which has considered one of these phases of the subject.

The subcommittee on communicable diseases transmitted through milk collected information on the human and bovine diseases that may be or are milk-borne, the epidemiological evidence of each disease, and the number of recorded outbreaks of disease traced to milk or milk products during the past six years.

The subcommittee on the public-health supervision of milk, obtained information on the essential elements of milk supervision, the legal aspect of its supervision, the measurement of the results of milk supervision effort, and the present status of milk supervision in this country.

The subcommittee on the nutritional aspects of milk considered the nutritive properties of cow's milk and milk products and the nutritive properties of human milk.

The subcommittee on the economic aspects of milk obtained information on the consumption of fluid milk and other milk products, the production, marketing, transportation, processing, and delivery of milk, and the economic importance of the sanitary quality of milk and cream.

For the purposes of this report, each subcommittee has presented a brief statement containing the conclusions it has drawn from its studies and its recommendations based thereon. The individual subcommittee reports follow.

Report of Subcommittee on Communicable Diseases Transmitted Through Milk

The newest and freshest food that we consume in some form every day is at the same time the oldest-known food of which there is an accurate historical record.

Archæologists have recently discovered on the façade of the temple at Ur a milking scene; thus as long ago as 4000 B. C. milk was an important source of food in that ancient civilization of the Chaldees.

The Bible has many references to milk.

The wise King Solomon admonished his people "to have goat's milk for the food of thy household and for the maintenance of thy maidens." No wonder he is represented to be the wisest man in the world!

All down the ages history records the use and importance of milk as a food. Even the legendary tales of ancient Rome recite the most astonishing and magical event of the twin boys, Remus and Romulus, afterwards the founders and heroes of Rome, who, as children, were abandoned in a cave to perish, but who were miraculously nurtured by a "she" wolf with her milk until they were found and rescued.

These actual and legendary records but emphasize the fact of the important place as a food that milk held during all the ages of recorded history.

Babies who were denied mother's milk have been dependent for their nourishment and, indeed, their life, upon milk from some one of our domestic animals, usually the cow, goat, ass, or camel.

The production of an abundant, safe, and wholesome milk supply has been attended with great difficulties and its success or failure has in a large measure conditioned the life hazard of babies who could not be breast fed, as revealed in the infant mortality tables of the various countries of the world, particularly mortality due to the diarrheal diseases. Not only is the life hazard of bottle-fed babies most favorably influenced by a pure and wholesome milk supply, but the average level of robust health of infant, child, and adult as expressed in normal nutrition and vigorous resistance to disease is enormously increased and promoted, for milk and milk products have become one of our most important and indispensable foods in the daily dietary of America.

The tremendous increase in production and consumption of milk and milk products has brought with it problems relating to its safety and wholesomeness.

The recurring milk-borne epidemics, with their annual total of sickness, deaths, and economic loss should be considered in the light of impressive evidence that milk control officials, milk distributors, and dairymen have a tremendous responsibility in securing for the consuming public a clean and safe milk. The evidence that this responsibility has not yet been fully met is presented in the following table of milk-borne epidemics occurring in the United States during the past six years.

Table 1.—*Number of milk-borne epidemics in the United States—Cases and deaths by disease and year during the six years 1924–1929*

[Reported by State health officers]

Disease	Number of milk-borne epidemics, cases and deaths: 6 years			1929				1928				1927				1926				1925				1924			
	Epidemics	Cases	Deaths	Number of States reporting	Number of epidemics	Number of cases	Number of deaths	Number of States reporting	Number of epidemics	Number of cases	Number of deaths	Number of States reporting	Number of epidemics	Number of cases	Number of deaths	Number of States reporting	Number of epidemics	Number of cases	Number of deaths	Number of States reporting	Number of epidemics	Number of cases	Number of deaths	Number of States reporting	Number of epidemics	Number of cases	Number of deaths
All diseases	258	10,906	371	48	44	1,959	48	48	36	2,021	87	48	27	770	34	45	66	2,866	70	33	44	1,916	42	32	41	1,374	90
Diphtheria	8	208	1	0	0			1	1	72	0	1	1	9	0	2	3	64	0	2	2	40	1	1	1	28	0
Dysentery	1	8	0	1	1	8	0	0				0				0				0				0			
Gastroenteritis	4	391	0	0	0			1	1	84	0	0				2	3	307	0	0				0			
Paratyphoid	3	93	1	1	1	38	1	0				1	1	45	0	1	1	10	0	0				0			
Poliomyelitis	1	11	2	0	0			0				0				0				1	1	11	2	0			
Scarlet fever	34	1,974	10	5	9	722	1	6	8	443	5	3	3	224	0	3	4	205	3	4	5	138	1	4	5	242	0
Septic sore throat	22	4,161	76	5	7	739	13	3	3	1,080	49	1	1	139	3	3	4	1,038	9	5	6	1,085	2	1	1	80	0
Typhoid fever	177	4,019	281	18	25	450	33	12	18	310	33	15	19	346	31	23	51	1,242	58	10	30	642	36	21	34	1,029	90
Undulant fever	8	41	0	1	1	2	0	3	5	32	0	1	22	7	0	0				0				0			

A review of the milk-borne epidemics for 1929, compared with the 5-year period 1924–1928, is not very reassuring from the standpoint of reduction of epidemics and in cases of illness therefrom with their attendant deaths.

Table 2 reveals the situation as reported by the several State health officers of the United States:

TABLE 2.—*Milk-borne epidemics in the United States in 1929—cases and deaths by disease—as compared with those of the preceding 5-year period*

[Reported by State health officers]

Disease	Number of States reporting	Milk-borne epidemics, cases and deaths											
		1929						5-year period, 1924 to 1928					
		Epidemics		Cases		Deaths		Epidemics		Cases		Deaths	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
All diseases		44		1,959		48		214		8,947		323	
Diphtheria	0	0						8	3.73	208	2.32	1	0.30
Dysentery	1	1	2.27	8	0.41	0	0						
Gastroenteritis	0	0						4	1.86	391	4.37	0	0
Paratyphoid	1	1	2.27	38	1.93	1	2	2	.93	55	.61	0	0
Poliomyelitis	0	0						1	.46	11	.12	2	.61
Scarlet fever	5	9	20.45	722	36.85	1	2	25	11.68	1,252	14.00	9	2.78
Septic sore throat	5	7	15.90	739	37.72	13	27.08	15	7.00	3,422	38.24	63	19.50
Typhoid fever	18	25	56.81	450	22.97	33	68.74	152	71.02	3,569	39.89	248	76.78
Undulant fever	1	1	2.27	2	.10	0	0	7	3.27	39	.43	0	0

Table 3 sets forth the sources of milk infection as disclosed by the reports from the State departments of health. Of the 44 epidemics, 13 were traced to chronic carriers of disease; 18 to sick persons continuing to work in the dairy (so-called ambulatory cases); 5 epidemics were reported to be due to contaminated and unsterilized bottles which were returned from homes where sickness prevailed; 4 were said to be due to the polluted water supply; and 1 is attributed to diseased dairy cows. "Carriers" and "cases on dairies," the two most frequent sources of milk infections, combined caused 31 epidemics, or 76 per cent of the total, involving 1,836, or 90 per cent, of the cases and 23, or 51 per cent, of the deaths.

TABLE 3.—*Sources of milk infection in the United States by diseases—Milk-borne epidemics in 1929—Cases and deaths*

[Reported by State health officers]

Disease	Source of milk infection																		Total, all sources		
	Unknown			Carrier			Case on dairy			Case on route (returned bottles unsterilized)			Dairy water supply			Dairy cows					
	Number of epidemics	Number of cases	Number of deaths	Number of epidemics	Number of cases	Number of deaths	Number of epidemics	Number of cases	Number of deaths	Number of epidemics	Number of cases	Number of deaths	Number of epidemics	Number of cases	Number of deaths	Number of epidemics	Number of cases	Number of deaths	Number of epidemics	Number of cases	Number of deaths
All diseases	3	123	3	13	254	11	18	1,391	12	5	142	19	4	47	3	1	2	0	44	1,959	48
Diphtheria																			0	0	0
Scarlet fever							8	716	1	1	6	0							9	722	1
Septic sore throat	1	100	3				6	639	10										7	739	13
Typhoid fever	1	15	0	12	216	10	4	36	1	4	136	19	4	47	3				25	450	33
Undulant fever																1	2	0	1	2	0
Paratyphoid				1	38	1													1	38	1
Dysentery	1	8	0																1	8	0

In the fall of 1923 the American Child Health Association, in cooperation with the Conference of State and Provincial Health Authorities and the Association of Dairy, Food, and Drug Officials, inaugurated what was announced at the time as "A nation-wide movement to secure for every baby, child, and adult in America a clean and safe milk supply." This cooperative work has been carried on continuously since its inauguration. Up to 1930, 29 States and one Province of Canada have been surveyed as to the conditions of milk production and distribution in fairly representative sections of the States. The results of these surveys show that the milk supply in the smaller cities and country towns is not generally produced and distributed under such sanitary conditions and safeguards as to insure a safe supply of milk to the ultimate consumer. In these smaller communities a very small percentage of the milk is pasteurized;

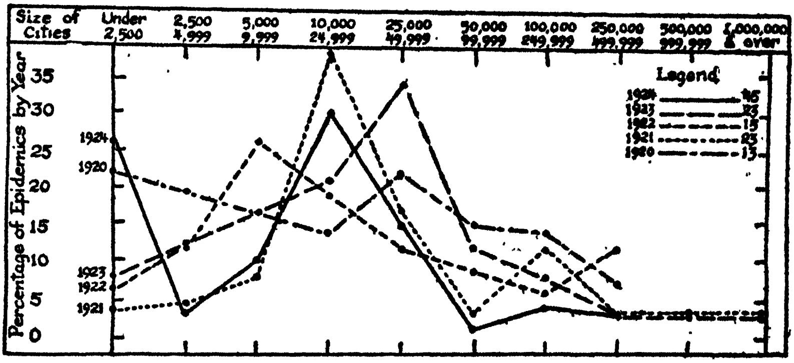

CHART 1.—Milk-borne epidemics in the United States, 1920-1924, reported by State health officers. Of the 119 epidemics recorded on the chart, the major percentage distribution of them occurred in cities of from 10,000 to 25,000 population and in smaller communities, including the rural sections and towns under 2,500 population

thus the continuing annual epidemics of milk-borne diseases need not be a matter of surprise, although it is a matter of great concern from the standpoint of public health. This point of view is supported by the epidemiological evidence shown in Charts 1 and 2.

The probable reason for the higher incidence of milk-borne epidemics in the small country towns and rural sections, and the cities of from 5,000 to 25,000 is that in such communities we find the largest population groups being served almost wholly by raw milk; that is, milk not produced under effective or, in the majority of instances, any source of continuing control. From these studies one may fairly conclude that in the average American city of from 5,000 to 25,000 population, and in the small towns and rural communities one may expect to encounter the greatest health hazard in relation to the consumption of unpasteurized milk.

If we may use milk-supply control as an indication of sanitary development, health department practice in the small town is still

in its infancy. This milk supply is little better in sanitary quality than it would have been if approved processes of pasteurization had never been discovered. The large cities have long recognized the

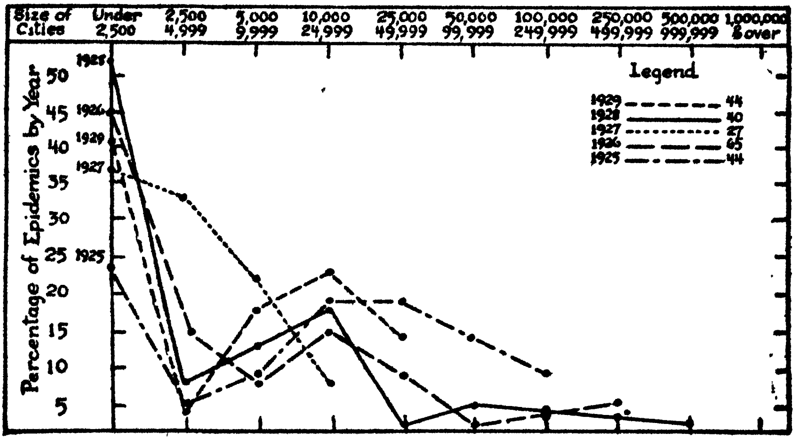

CHART 2.—Milk-borne epidemics in the United States, 1925–1929, reported by State health officers. Epidemics occurring in cities during the period 1925–1929 have somewhat the same distribution as those of the period 1920–1924, although in the later period the larger percentage of milk-borne diseases occurred in the rural districts and in towns under 2,500 population

protection afforded by pasteurization, and thus, so far as milk-borne diseases are concerned, are reasonably well protected. The problem of the small town and city is to awaken its citizens to the need for clean milk, rendered safe by pasteurization. When we remember

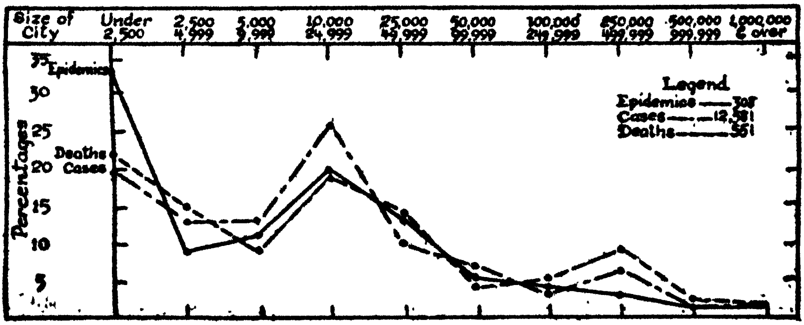

CHART 3.—Milk-borne epidemics in the United States, 1920–1929, reported by State health officers (1920 populations). The percentage distribution of milk-borne epidemics during the decade 1920–1929, as expressed in cases and deaths distributed by population of communities affected, shows the same general trend—the higher percentages occurring in cities of between 5,000 and 25,000 population and in towns under 2,500 population, including rural communities

that approximately 50 per cent of our population resides in the small towns and rural communities, and thus in the main are without the protection that pasteurized milk affords, the importance of this type of public health problem is self-evident.

It seems reasonable to conclude that until the time when we have efficient pasteurization of milk, frequent outbreaks of milk-borne epidemics may be expected.

A search of literature reveals an occasional epidemic of disease caused by dairy products other than milk. Thus there have been recorded five ice-cream epidemics, three of which were outbreaks of typhoid fever, one an outbreak of scarlet fever, and one of septic sore throat. There have been three outbreaks due to infected cheese—one epidemic of typhoid fever, one of streptococcic infection, and one of gastro-intestinal disease. There has been but one outbreak traced to cream, that being a typhoid-fever epidemic.

The same precautions in relation to the protection, manufacture, and distribution of dairy products should be carried out as are necessary in the production and distribution of milk, if we are to be assured of a constantly safe supply of these wholesome dairy products.

A classic illustration, and perhaps the most striking example of the immediate effect in the reduction of diarrheal diseases of infants by the pasteurization of the milk, is that which occurred on Randall's Island, N. Y., in a children's institution, where a mortality of 44.36 was promptly reduced to 19.80 after all the milk was pasteurized, no other hygienic measures being put into operation.

That effective milk supervision and control does greatly reduce that portion of infant mortality due to diarrhea and enteritis is shown by experience in a number of American cities. An excellent example of the apparent correlation between the reduction of fatalities from diarrhea and enteritis and the increase of pasteurization of milk supplies in communities of 10,000 or more is the experience in Massachusetts, which is graphically shown in Chart 4.

It has long been understood, and is being increasingly emphasized, that milk of an insanitary quality or a high bacterial content can not be made into a high grade, wholesome milk through the process of pasteurization. Park and others have shown that milk of a high bacterial content, even when pasteurized, is not a wholesome food for infant feeding. Pasteurization, therefore, is not a substitute for the clean and sanitary production of milk.

However, inasmuch as large numbers of our population living in the smaller cities, towns, and rural communities can not, under present conditions, avail themselves of a wholesome pasteurized milk supply, it becomes all the more necessary that effective sanitary control be instituted in these communities for the production and distribution of a clean and safe milk supply. Perhaps the most promising movement in this direction is the growing demand for the installation and maintenance of full-time county or district health units, through which means a constant and continuing supervision of milk supplies

may be secured. In the absence of local health supervision, the State must assume the responsibility of local milk control.

In some communities milk producers and distributors, recognizing the importance of clean and safe milk, have joined with sympathetic and helpful officials in cooperative effort in the providing of a clean and wholesome supply. Such efforts are commendable and should be fostered wherever possible. The milk-control work in California is an excellent example of such effective teamwork, which has resulted in increased consumption and increased profits for the producers.

Fortunately, purity and cleanliness of milk are the chief requisites in flavor and general wholesomeness, so that the real interests of both milk producers and distributors and the public control officials run

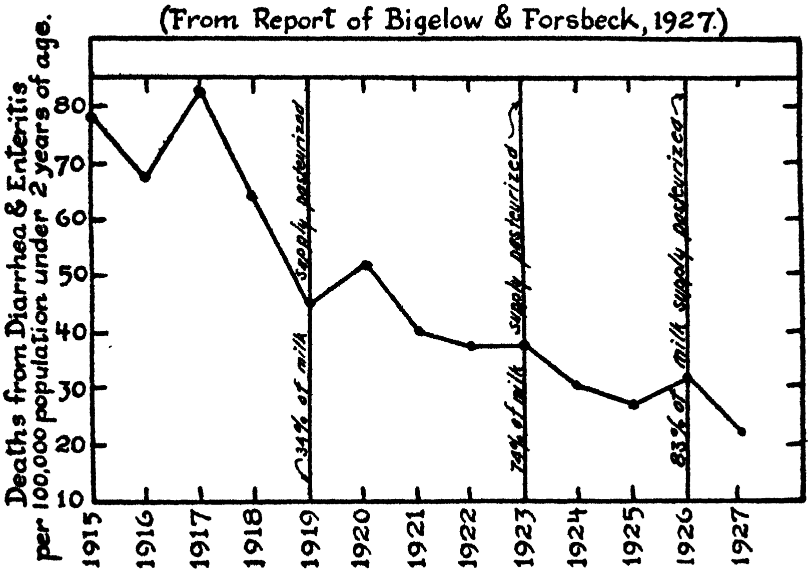

CHART 4.—Correlation between deaths from diarrhea and enteritis and the pasteurization of milk supplies in communities of 10,000 or more population in Massachusetts

parallel and thus afford a common ground upon which effective milk control may be instituted.

The spread of human diseases through the medium of milk is of much greater epidemiological significance than the direct transmission of infections from cattle, and their prevention calls for certain precautions other than those here suggested.

Tuberculosis.—In 1898, Theobold Smith published the results of his extensive studies on tubercle bacilli from different sources—7 from human sputum, 5 from cattle, and 1 each from a cat, horse, and pig. His conclusions were that there exist "a distinctively human, or sputum, and a bovine variety of tubercle bacilli". He describes with great clearness the differences that exist between these two types, in

their morphology, cultural characters, and virulence, especially for rabbits and calves.

With the difference between the two types of tubercle bacilli clearly defined, it was possible to determine with reasonable certainty whether the bacilli in a tuberculous tissue belonged to the human or to the bovine strain. Extensive researches on the types of tubercle bacilli were undertaken especially in the Gesundheitsamt in Berlin, by the British Commission on Tuberculosis, human and bovine, and in the research laboratory of the New York City Board of Health. In addition to these major investigations many specimens have been studied by different workers. The appended table, compiled by Park and Krumwidie from data obtained at the time bovine tuberculosis was at its peak in this country, gives the findings in a total of 1,220 examinations.

TABLE 4.—*Types of tubercle bacilli in 1,220 human infections*

Diagnosis	Adults of more than 16 years		Children from 5 to 6 years		Children younger than 5 years	
	Human	Bovine	Human	Bovine	Human	Bovine
Pulmonary tuberculosis	644	1	11		23	1
Glandular tuberculosis (axillary or inguinal)	2		4		2	
Cervical gland tuberculosis	27	1	36	21	15	21
Abdominal tuberculosis	14	4	8	7	9	13
Generalized tuberculosis (alimentary origin)	6	1	2	3	13	12
Generalized tuberculosis (with meningitis, alimentary origin)	29		5	1	46	13
Generalized tuberculosis (with meningitis)	5		7		52	1
Tuberculous meningitis	1		3		27	4
Bone and joint tuberculosis	27	1	38	3	26	
Genito-urinary tuberculosis	17	1	2			
Cutaneous tuberculosis	3		1		1	
Other tuberculoses:						
Of the tonsils				1		
Of the mouth and glands of the neck		1				
Of the maxillary sinus	2				1	
Latent tuberculosis						
Total	777	10	117	36	215	65

The commissions and laboratory mentioned report a total of 121 cases of tuberculous meningitis that have been studied. Twenty-one were in persons from 5 to 16 years of age, from which the human type was isolated in 19 cases and the bovine in 2. The remaining 100 were in children under 5 years of age, of which 80 contained the human and 20 the bovine bacillus.

Cobbett collected the reports of the examinations of 57 cases of abdominal tuberculosis, of which 10 were in adults. In 8 adult cases the human type was recovered, and both forms were present in 2. In the 47 cases under 16 years of age, 19 were due apparently to the human type and 28 to the bovine.

The examination of 49 cervical glands that had been removed surgically from adults showed that 40 contained the human and 9 the bovine organism. The study of 115 such cases in children between

the ages of 5 and 16, showed 52 to contain the human and 63 the bovine, and in 83 cases in children under 5 years of age 17 showed the human and 68 the bovine type.

According to Cobbett the prevalence of the bovine type in cervical glands that had been removed surgically from persons 16 years of age and younger varied considerably in different countries. In Scotland it was 87 per cent, in the United States 53 per cent, in England 50 per cent, and in Germany 35 per cent.

The probable source of infection is through raw milk from cows affected with tuberculous udders. Smith concluded that "bovine tuberculosis may be transmitted to children when the body is overpowered by large numbers of bacilli, as in udder tuberculosis or when certain unknown favorable conditions exist."

In the United States, the control of bovine tuberculosis is solving the problem of human infection with the bovine strains. In 1917 the Federal Government, in cooperation with the States, undertook to eradicate bovine tuberculosis by the accredited herd plan. Already large areas have been freed from this disease. There are 976 modified accredited counties in the United States. There are 2,435,000 herds that contain 20,983,000 animals that are once-tested-free. There are over 27,000,000 cattle now under official supervision and the work is progressing rapidly. In the month of June, 1930, there were 986,607 cattle tested. Nowhere have veterinarians undertaken a more comprehensive sanitary problem than in the elimination of tuberculosis from the cattle of this country. While this is being done, health officials are insisting on pasteurization which destroys tubercle bacilli, if they are present in the milk.

Undulant fever.—In recent years undulant fever has been recognized as one of the diseases of cattle communicable to man through milk.

Undulant fever is caused by *Brucella abortus* [*Brucella melitensis*], which is responsible for infectious abortion in cattle and swine. Bang and Stribolt, of Copenhagen, described this organism in 1897, but its infectiousness for man was not recognized until recently. Like tuberculosis, the specific organisms of infectious abortion found in different species have been differentiated into three distinct races or species, namely: *Brucella melitensis* [*Brucella melitensis* var. *melitensis*], the cause of Malta fever in man; *Brucella abortus* [*Brucella melitensis* var. *abortus*], the cause of infectious abortion in cattle, and which produces a disease in susceptible people similar to Malta fever; and *Brucella suis* [*Brucella melitensis* var. *suis*], the strain that has been isolated from swine.

The first case of human infection with *Brucella abortus* reported in America was described by Keofer in 1924. In 1926, Carpenter and Merriam reported two cases in Ithaca. The same year Moore and

Carpenter called attention to four others. By aid of the Hecksher Fund, Carpenter, Parshall, and Baker were able to study this disease and to test the pathogenesis of the specific organisms isolated from man on guinea pigs and pregnant heifers. They reported 18 cases in man. In addition they found *Brucella abortus* in 8 of 55 pairs of tonsils examined that had been removed by local surgeons.

The results of studies made at the New York State Veterinary College showed that in a period of two years 26 cases of undulant fever had been recognized in a population of 337,000, in a highly developed dairy district. There were no fatalities and but very few of the cases were seriously ill. All of them were in people who stated that they drank freely of raw milk. None of them were butchers or engaged in handling meat or in raising swine. In a number of instances the milk came from herds where Bang abortion disease was found to be prevalent. In one instance the "family cow" was the only one in the herd whose milk was infectious. An examination of the samples of market milk showed that approximately 20 per cent of the raw market milk sold in this territory contained *Brucella abortus* in sufficient numbers to produce lesions in guinea pigs. It was found also that from 20 to 35 per cent of the dairy cows that gave a postive agglutination test were eliminating the organism in their milk. However, of the cows that had actually aborted, 40 to 50 per cent harbored *Brucella abortus* in their udders.

Hardy collected the cases of undulant fever that had been reported in the United States up to July, 1929. He found a total of 1,296 cases distributed in 43 States. Of these less than 3 per cent were in children under 10 years of age. He did not include those cases reported from Texas, Arizona, and New Mexico, which are likely to be of goat origin. He records 223 cases from Iowa, of which 116, or 52.3 per cent, were in country people and 23, or 10.4 per cent, were in urban residents employed in packing houses. There were 30 cases, or 13.4 per cent, who lived in cities but who were not engaged in handling animals or meat, and 53, or 23.9 per cent, who lived in towns of less than 5,000 population.

There is a voluminous literature, including reports of cases, setting forth the supposed source of infection of this newly recognized disease in man. Undoubtedly there are many cases not reported, and it is possible that young children may be affected more often than it is now supposed. However, the data available suggest that undulant fever is not of so great an epidemiological significance as certain writers have implied. Smith has pointed out that the bovine type of *Brucella abortus* is so slightly invasive for man that it fails to produce appreciable disturbances, but that as a by-effect it may immunize toward the more virulent types of bovine and caprine origin. He also shows that the porcine type may become seeded in the udder

of the cow, just as hemolytic and scarlatenal streptococci, under certain unknown conditions, may gain a foothold in it, from which they are ingested with the milk.

The practical question with which this conference is concerned is, how can human infection from the strain or strains of *Brucella* that come to man through milk be prevented? Undoubtedly infections occur through the handling or working with infected animals and animal tissues, but these are separate from milk-borne infections. It is significant to note that the majority of cases recorded were in country people where pasteurization of milk is rare, or in those who lived in cities but were employed in packing houses.

Fortunately, the control of the milk-borne cases of undulant fever is not difficult. It involves the proper pasteurization of all market milk and that consumed on the farms, until the time when dairymen have eradicated Bang abortion disease from their animals. Well formulated and workable plans are advocated by competent veterinarians and also by a few State livestock sanitary boards to aid cattle owners in their efforts to eliminate this infection from their herds. "Sound animals only" is rapidly becoming the slogan of milk producers.

Septic sore throat.—In 1875 septic sore throat due to infected milk was recognized in South Kensington, England. In May, 1911, an outbreak occurred in Boston, Mass. Winslow made a careful epidemiological study of the 1,400 cases involved and found that 70 per cent were supplied with milk from one dairy. Smith isolated a streptococcus from the tissues of four fatal cases. The relation of streptococci to udder infection was suspected as early as 1884 by Nocard and Mollereau. The epidemics of septic sore throat traced to milk infection that have been reported since 1910 are numerous and the total number of cases extends into the thousands with many deaths. The one in Chicago in 1911 reported by Capp and Miller is estimated to have numbered 10,000 cases and the one in Lee, Mass., in 1928, involved 1,000 cases with 40 deaths. The United States Public Health Service reports from 1918 to 1926, inclusive, 16 epidemics with 3,179 cases and 34 fatalities. In 1929 there were reported in the United States 7 epidemics with 739 cases and 13 deaths, and in Canada 4 epidemics with 37 cases and 3 deaths. Measured by the number of fatalities, septic sore throat is the most serious of the milk-borne diseases traced to udder infection. However, it occurs among adults more than in young children. In the Lee epidemic only 20 per cent of the cases were in persons under 15 years of age.

Extensive studies have been made to differentiate the form of mastitis that is responsible for this affection. More recent studies have shown that the streptococci found in mastitis belong to at least

two distinct groups or species, namely, *Streptococcus epidemicus* that causes septic sore throat in man, and *Streptococcus mastiditis*, the cause of certain udder troubles. *Streptococcus epidemicus* is believed by many bacteriologists to be of human origin. The explanation is, that it finds its way into the milk ducts of the udder from infected persons, multiplies in the milk in the udder, and escapes with it. This streptococcus may be present in large numbers before lesions in the udder appear and before there are symptoms to arouse suspicion on the part of the milker.

The control of this form of septic sore throat rests in efficient pasteurization, since the streptococcus causing it may not produce tissue changes in the udder of the infected cow and can not always be excluded by physical examination.

Scarlet fever.—While the causative agent in milk-borne scarlet fever is considered generally as coming from a case of human infection, transported in milk, there is evidence that *Streptococcus scarletinæ* may become located in the udders of cows where it multiplies and causes a definite mastitis. In such cases the diseased udder becomes a source of supply for the distribution of the specific streptococcus. Jones and Little were the first to furnish bacteriological evidence that cows could be infected with the scarlet fever organism. They reported a case where the milk of an infected udder contained 345,000,000 streptococci per cubic centimeter. The streptococcus answered all the requirements for that of scarlet fever.

Jones has pointed out that milk, under ordinary conditions, inhibits the growth of scarlet fever streptococci and that the usual opinion that milk-borne epidemics of this disease are due to a human case or carrier on the farm, or in the dairy, may be erroneous, as the cause may have its immediate origin in an infected udder. The present knowledge indicates that dairy cattle should be protected against infection from human carriers. In addition, the milk should be pasteurized.

Mastitis.—In recent years a number of outbreaks of illness, largely among children, and usually of short duration, have been reported following the consumption of milk from cows suffering with mastitis and from which streptococci were isolated. The reports by Massey in the London Lancet and by Laidlaw in a New York State journal of medicine, suggest that streptococci in cases of mastitis may be injurious. Acting on this supposition, veterinary inspection of dairies is being increased and more attention is being given to pasteurization.

Miscellaneous disturbances.—A disease of cattle known as "trembles" has been reported from certain restricted areas in the United States. The milk of affected cows transmits the disease to man.

In case of catarrhal and parenchymatous mastitis, the pus present in the milk may be harmful, especially to young children. In cases of disease in which cows have a high temperature, the milk may cause unpleasant symptoms. Milk from cows suffering from indigestion may possess properties of an irritating nature.

The greatest factor in the protection of milk against contamination of all kinds is the human equation. Knowledge and regulations are too often neglected both by milk producers and by consumers. Milk to remain wholesome must be cared for properly after it leaves the udder. This involves an intelligent understanding of its nature and how to protect it. Improvement depends on the application of sanitary principles. The course for obtaining an almost perfect milk supply in this country is blazed unmistakably and in the main the people are following the trail.

From the data gathered from a large number of reports and results of special researches on the transmission of disease from cattle to man through milk, the intensive work of the Federal and State Governments to eradicate bovine tuberculosis in this country, the active interest that is being taken by many dairymen and a few States to eliminate Bang abortion disease, the thorough physical examination of dairy cows by competent veterinarians and the exclusion of diseased individuals required by the large milk companies and many municipalities, and the demands of health officials in all large and most smaller cities that, *in addition to the precautions in its production, market milk should be pasteurized*, the following conclusion may be drawn: That the diseases mentioned in this report would, under solely natural conditions, become a serious menace to human health; but that the measures imposed by municipalities generally, and exacted by all responsible milk distributors to safeguard it against all possible contamination and infections, eliminate, for the greater part, the danger otherwise imminent, except for residents of rural districts and smaller towns where the preventive measures, especially pasteurization, are as yet not observed as fully as they are in the larger centers. The result of these united efforts is to give the American public a progressively cleaner and safer market milk.

RECOMMENDATIONS

I. That pasteurization be required wherever practicable.

II. That pasteurization is not intended to take the place of the sanitary production of clean and wholesome milk, but rather to provide the final factor of safety from milk-borne diseases.

III. That cooperative effort between producers, control, and educational officials give promise of the best and most lasting results.

IV. That in the absence of local milk control the State must assume this responsibility.

Dr. S. J. Crumbine, *Chairman*.
Dr. V. A. Moore.
Lucius P. Brown.

Report of the Subcommittee on the Public Health Supervision of Milk

The subcommittee on the public health supervision of milk has attempted to formulate answers to the following questions:

(1) What are the essential elements of the public health supervision of milk supplies?

(2) What fundamental items should be included in the laws or regulations relating to the public health supervision of milk supplies, and what agencies should enforce them?

(3) How should the results of the enforcement of the laws or regulations for the public health supervision of milk supplies be evaluated?

(4) What is the present status of the public health supervision of milk supplies in the United States?

(5) What recommendations should the White House Conference make with reference to the future improvement of the public health supervision of milk supplies in the United States?

WHAT ARE THE ESSENTIAL ELEMENTS OF THE PUBLIC HEALTH SUPERVISION OF MILK SUPPLIES

Since 40 or more milk-borne outbreaks of disease are reported annually in the United States with a resultant unnecessary toll of death and disease, all official public health agencies should be empowered to apply all essential public health measures for their prevention. These should include:

(*a*) Inspection of farms and plants;

(*b*) Supervision of the physical examination and testing of cows;

(*c*) Laboratory examination of milk;

(*d*) Physical examination of workers and residents at farms and plants, including laboratory examination of body discharges; and

(*e*) Pasteurization control of general market milk.

(*a*) *Inspection* is designed to disclose whether the necessary public health precautions have been applied at the farm and plant, and therefore whether the degree of cleanliness and safety of the milk supply which these precautions provide has been assured. To be most effective inspections should be made at irregular but frequent intervals by competent inspectors.

However, sanitary inspection can not protect against infectious cows or infectious employees, nor can it insure the maintenance of proper methods between inspections. Therefore this milk control

measure can not alone be depended upon to insure a clean, safe milk supply.

(*b*) *Physical examination and testing of cows.*—Studies of the relation of bovine diseases to the public health have emphasized the importance of periodic physical examination and testing of cows for certain diseases transmissible by cows through milk to man. Much can be done by means of this measure to reduce disease transmission through milk, although the examinations and tests are not infallible and can not be made at sufficiently frequent intervals to insure the absence of infectious cows from the herds at all times.

(*c*) *Laboratory examination of milk.*—Laboratory examination of milk provides a valuable index with respect to cleanliness and safety and is deserving of both more intensive and more extensive use. Such examinations provide useful supplementary information. However, no known practicable laboratory examination of milk supplies will dependably disclose the existence of infectious cows, infectious employees, insanitary privies, unsafe water supplies, or fly contamination. Therefore, laboratory examination of milk should not alone be relied upon to insure a clean, safe milk supply.

(*d*) *Physical examination of workers and residents at farms and plants.*—Studies of the epidemiology of milk-borne outbreaks of disease have emphasized the importance of making periodic physical examinations of workers and residents at farms and plants, including laboratory examination of body discharges. Many epidemics of typhoid fever, for example, can be prevented by this measure. However, since such examinations are not infallible and can not be made at sufficiently frequent intervals to insure the absence of infectious persons from farms and plants at all times, this measure, while useful, should not alone be relied upon to prevent the transfer of infection from such persons to the milk.

(*e*) *Pasteurization control.*—Pasteurization, properly done, renders harmless or destroys all disease-producing organisms known to be transmitted through milk to man, and does not significantly impair or alter the flavor and food value of milk.

Because of the fact that the public health measures previously discussed are not of themselves completely protective, either singly or in combination, pasteurization control may be regarded as a necessary final public health safeguard for all general market milk supplies.

However, even pasteurization is subject to the fallibility of its operators; and while all health officers should persistently emphasize the fact that all milk may advantageously be pasteurized before it is consumed, either in a properly supervised commercial plant or at home, this measure should not be considered as rendering unnecessary any of the previously discussed measures. Pasteurization should go hand in hand with all other essential public health measures in order to insure a clean, safe milk supply.

WHAT FUNDAMENTAL ITEMS SHOULD BE INCLUDED IN THE LAWS AND REGULATIONS RELATING TO THE PUBLIC HEALTH SUPERVISION OF MILK SUPPLIES AND WHAT AGENCIES SHOULD ENFORCE THEM?

The first part of this question will be discussed under three subdivisions, namely, municipal, State, and federal legislation.

Municipal milk ordinances or regulations.—Municipal milk ordinances should be definite, clear, and brief. They should contain the following elements:

(*a*) Definitions of milk, milk products, and other terms used in the ordinance or regulation;

(*b*) Prohibition of the sale of adulterated milk and milk products;

(*c*) Provision for permits, and for permit revocation;

(*d*) Requirements governing the labeling of containers;

(*e*) Requirements relating to the frequency of inspection and reinspection, and the posting of inspection reports;

(*f*) Requirements relating to the frequency of taking milk samples, and to the laboratory examination thereof;

(*g*) Specifications for certified milk, grade "A" raw milk, and grade "A" pasteurized milk; and

(*h*) One of two alternative devices for punishing violations of grade requirements, namely—

For cities which wish to maintain high grade supplies by the de-grading method this section should provide that when a given milk supply is found to violate the specifications under which it is labeled, it shall be labeled with one of a number of lower-grade letters, depending upon the nature of the violation. In this case the specifications for the various lower-grade labels should be added to section (*g*).

For cities which wish to maintain high-grade supplies by the permit-revocation method, this section should provide that when a given milk supply is found to violate the specifications under which it is labeled it shall be barred from the market by revocation of permit. In this form of ordinance the lower-grade specifications need not be included in section (*g*).

(*i*) The usual sections relating to penalties; repeal of conflicting, prior legislation; date of effect; and unconstitutionality.

State milk laws or regulations.—It is generally conceded that centralized and standardized administration tends to lead to greater efficiency and to a lower per capita cost, but may also lead to an undesirable expansion of bureaucracy. On the other hand, decentralized administration, if undirected, tends to lead to inconsistency and inefficiency of method. The subcommittee believes that so far as possible every municipality should regulate its own milk supplies, but that all municipalities should attempt to secure the advantages

of centralized administration, without incurring its disadvantages, through a voluntary program of standardization of methods.

The opinion is held in some States, however, that milk supervision should be placed on a State law basis. For States which prefer this plan the subcommittee recommends that the State law contain essentially the elements previously enumerated for municipal milk ordinances. The law may be enforced either directly by State personnel or may make enforcement by all municipalities in a specified classification mandatory.

States which desire to promote a *voluntary* uniformity of municipal supervision through State legislation may pass essentially the same regulations as above except that provision is made that they shall be in force only in such localities in which they are approved by the city or county health department.

Finally many States, probably the majority for many years, will wish to promote voluntary uniformity entirely without the agency of State legislation. For these the best plan is for the State to promulgate an *advisory* standard municipal milk ordinance and to encourage its local adoption.

The subcommittee believes that there is as yet insufficient evidence to justify a conclusion as to the relative excellence of these methods.

Federal legislation relative to the public health aspects of milk and milk products.—The Federal Government is now authorized by Congress, and should continue to be so authorized—

(*a*) To conduct research and to make investigations and surveys on all phases of the public health supervision of milk and milk products, and to publish the results thereof;

(*b*) To enforce legislation relating to the interstate aspects of the public health supervision of milk and milk products; and

(*c*) To give advice and cooperative assistance to State and local public health authorities with reference to the public health aspects of milk and milk products.

What agencies should enforce the laws or regulations relating to the public health supervision of milk supplies?—The supervision of milk, cream, and other dairy products is of vital public health concern and economic importance, and should receive the coordinated attention of all State and local agencies, including public health authorities, agricultural departments, and agricultural, educational, and extension organizations within the State or community. The subcommittee recommends that inasmuch as the laws and regulations in question deal only with measures which are designed primarily to protect the public health, they should, where practicable, be made the function of health authorities, local, State, and Federal. The public health supervision of municipal milk supplies should obviously be the function of governmental departments primarily dedicated to

the public health point of view and technically trained in the recognition of all public health aspects of the problem.

HOW SHOULD THE RESULTS OF THE ENFORCEMENT OF THE LAWS OR REGULATIONS FOR THE PUBLIC HEALTH SUPERVISION OF MILK SUPPLIES BE EVALUATED?

Periodic ratings of the public-health status of milk supplies are necessary in order to insure a constantly maintained alertness and efficiency on the part of the responsible public-health officials and in order to provide a measure of progress from year to year. The subcommittee recommends that all municipalities should be surveyed and rated as frequently as practicable.

All such ratings should be based upon a common standard in order that they may be comparable. The grade A raw milk and grade A pasteurized milk requirements of the Standard Milk Ordinance may conveniently be used as such a common standard. These grades are the most widely used milk standards in existence to-day. They represent standards of quality which, if satisfied, would make the raw milk as safe as raw milk can practicably be made, and would make the pasteurized milk as safe as any milk can be made. Following is a discussion of a method of determining municipal, State, and Federal ratings.

The determination of municipal milk-sanitation ratings.—A proper milk-sanitation rating is one which measures the percentage extent to which all practicable public-health precautions have been applied. Such a rating can therefore be obtained by determining the percentages of the milk supply complying with each of those precautions and then finding the weighted average of these percentages. The weighting should be done on the basis of the relative importance of the various precautions. Such a system of weights has been developed by the Public Health Service in connection with its survey methods.

In order to obtain a comprehensive index it is advisable to compute two specific ratings, namely, the rating of the retail raw milk and the rating of the pasteurized milk. These two ratings together with the percentage of milk pasteurized will give a valuable estimate of the protection enjoyed by the milk consumer.

The determination of State and national ratings.—State ratings can be computed by determining the average of the municipal ratings, weighted on a gallonage basis. National ratings can be computed by determining the average of the State ratings, weighted on a gallonage basis, or by determining the average of the ratings of a sufficiently large group of representative cities, weighted on a gallonage basis.

The rating of enforcement methods.—In addition to the above ratings of the results of enforcement effort, the subcommittee further believes that the characteristics of the effort itself should be rated in

order to make apparent how effort and result are related, and what specific defect in effort had led to any given, low "result rating."

The rating of effort may be accomplished by establishing a schedule of enforcement measures, such as inspection, sampling, etc., and estimating on a percentage basis the degree of completeness with which the health officer has applied each measure. The average of these percentages, weighted on a relative importance basis, will yield a useful effort rating.

WHAT IS THE PRESENT STATUS OF THE PUBLIC HEALTH SUPERVISION OF MILK SUPPLIES IN THE UNITED STATES?

This question can be answered only by applying some standard yardstick, such as a standard schedule of items of sanitation. The most widely used schedule of public health requirements for milk control in use in the United States to-day is that embodied in the Standard Milk Ordinance. Therefore, the subcommittee has studied rating surveys made on that basis by the Public Health Service during the past several years.

These surveys include in all 430 American cities with a total population of 13,290,669. They are located in 21 States. Of the 430 cities, 247 had passed the Standard Milk Ordnance from a few months to seven years prior to the date of survey.

The following tables give the results of the surveys, computed on the basis of the evaluation method described in the preceding chapter of this report.

It should be noted that the figures in the tables are subject to minor revision after the Public Health Service has completed its surveys of all States. Any necessary revisions will be included in a supplementary report.

Inasmuch as the rating is based upon the items of sanitation required for grade "A" raw and grade "A" pasteurized milk in the Standard Milk Ordinance the following table gives separately the figures for Standard Ordinance and nonstandard Ordinance cities:

TABLE 1.—*Average status of the public health supervision of milk supplies in American municipalities, 1929–30*

	Cities enforcing provisions of Standard Ordinance	Cities enforcing other standards
Total number of cities surveyed	247	183
Total population of cities surveyed	4,472,236	8,818,433
Total number of States in which cities are located	14	11
Total daily milk sales represented in survey ... gallons	330,673	981,108
Total number of retail raw milk dairies surveyed	3,002	2,409
Total number of pasteurization plant producers surveyed	2,494	5,003
Total number of pasteurization plants surveyed	237	960
Average percentage of milk pasteurized ... per cent	50	90
Average rating of raw milk ... do	90	65
Average rating of pasteurized milk ... do	87	60

From Table 1 it is evident that the raw milk sold in cities enforcing the Standard Ordinance averages 90 per cent compliance with the grade "A" raw milk requirements, and that the pasteurized milk sold averages 87 per cent compliance with the grade "A" pasteurized milk requirements, as compared with compliance figures of 65 per cent and 60 per cent, respectively, in cities enforcing other ordinances. Whenever the milk supply is improved in quality, consumption invariably increases.

The difference in the percentage of milk pasteurized in these two groups represents a regional difference and not a difference in the two groups of milk regulations. This is demonstrated by the fact that the quantity of pasteurized milk in the cities enforcing this standard milk ordinance has doubled within an average period of approximately three years.

The higher ratings shown by cities enforcing the Standard Ordinance should not be taken as implying that no other type of ordinance will yield as high ratings. In fact it is undoubtedly true that many cities enforcing other types of ordinances have produced excellent milk supplies. The above figures represent averages only for the areas surveyed.

In addition to the above figures the subcommittee has considered it advisable to present an analysis of the survey results by size of city. These are given in Table 2, from which the following conclusions are noted:

(*a*) Retail raw milk tends to improve in quality as the size of the city increases.

(*b*) The quality of pasteurized milk shows no consistent trend, but there is a decided improvement in pasteurized milk when the 100,000 population group is reached.

(*c*) The percentage of milk pasteurized increases with size of city.

(*d*) The average quality ratings for both raw and pasteurized milk are consistently higher for cities enforcing the Standard Ordinance than for cities of the group studied enforcing other standards, throughout the range of population groups.

TABLE 2.—*Average status of the public health supervision of milk supplies in American municipalities by size of city, 1929–30*

	Cities enforcing provisions of the Standard Ordinance				Cities enforcing other ordinances			
	Under 10,000	10,000 to 50,000	50,000 to 100,000	100,000 and over	Under 10,000	10,000 to 50,000	50,000 to 100,000	100,000 and over
Total number of cities surveyed	139	85	17	6	87	68	9	19
Total population of cities surveyed	592,071	1,592,756	1,105,142	1,182,267	453,402	1,529,680	645,397	6,189,954
Total number of States in which cities are located	11	13	9	2	11	11	5	7
Total daily milk sales...gallons	35,637	109,745	83,534	101,757	41,059	156,667	77,084	706,298
Average percentage of milk pasteurized...per cent	19	42	46	73	48	73	91	96
Average rating of raw milk...per cent	88	89	90	95	55	61	66	78
Average rating of pasteurized milk...per cent	82	82	81	92	58	58	56	69

WHAT RECOMMENDATIONS SHOULD THE WHITE HOUSE CONFERENCE MAKE WITH REFERENCE TO THE FUTURE IMPROVEMENT OF THE PUBLIC HEALTH SUPERVISION OF MILK SUPPLIES IN THE UNITED STATES?

The subcommittee suggests that the following recommendations relative to the future improvement of the public health supervision of American municipal milk supplies be included with the general recommendations of the White House conference.

(*a*) Municipal milk-control measures should include supervision of the inspection of farms and plants, physical examination and testing of cows, laboratory examination of milk, physical examination of workers and residents at farms and plants, including laboratory examination of body discharges, and pasteurization control.

(*b*) All health authorities should persistently recommend to American milk consumers that pasteurization is an added factor of safety in a milk supply.

(*c*) All laws or regulations for the public health supervision of milk supplies, whether local, State, or Federal, should incorporate in so far as practicable uniform requirements at least the equivalent of those now contained in the standard milk ordinance recommended by the United States Public Health Service.

(*d*) The Federal Government should continue its present functions in research, investigations, surveys, publications, and advisory assistance to local and State health authorities with reference to the public-health aspects of milk and milk products.

(*e*) The supervision of milk, cream, and other dairy products is of vital public-health concern and economic importance, and should receive the coordinated attention of all State and local agencies, including public health authorities, agricultural departments, and agricultural, educational, and extension organizations within the State or community. The subcommittee recommends that inasmuch as the laws and regulations in question deal only with measures which are designed primarily to protect the public health, they should, where practicable, be made the function of health authorities, local, State, and Federal. The public-health supervision of municipal milk supplies should obviously be the function of governmental departments primarily dedicated to the public-health point of view and technically trained in the recognition of all public-health aspects of the problem.

(*f*) The milk supplies of all municipalities should be surveyed and rated as frequently as practicable in accordance with the method previously described in this report.

(*g*) Milk-control areas should provide adequate enforcement machinery in order to insure satisfactory results.

LESLIE C. FRANK, *Chairman*.
CHAS. O. H. LAUGHINGHOUSE, M. D.[1]
FRANK C. WILSON.

Report of Subcommittee on the Nutritional Aspects of Milk

Milk is a fluid secreted by the mammary gland for the nourishment of the young. It is variable in composition, depending upon species, breed, age, period of lactation, intervals between emptying the gland, time of year, and diet. Analyses of individual samples are not trustworthy in furnishing evidence for the composition of all milks. Cow's milk contains more proteins and ash than does human milk. If fed to infants the former must be modified by dilution with water and addition of carbohydrate. The fat content may be regulated by selecting milk from different breeds of cows. The principal constituents of milk are protein (casein, lactalbumin, lactoglobulin), carbohydrate (lactose), fat, mineral salts, vitamins, pigments, enzymes, and traces of numerous other substances. Most investigations have been carried out with cow's milk.

Casein is the protein most easily separated in a state of relative purity from milk. It has been more studied than any other protein. There is much reason to believe that even the purest casein still contains impurities. Some evidence has been brought forward to indicate that it is of dual nature. It is doubtful whether pure casein has ever been prepared. Even the question of homogeneity of casein has been raised. No significant differences have been detected in the elementary composition of caseins from different milks. Highly delicate immunological reactions seem to show that casein from the milk of one species is the same as that from the milk of another.

That two samples of milk with the same composition may not be equally readily digested by infants is shown by common experience. Some have attributed this to the differences in the size of the fat globule, others to the state of division of the curd. Human milk is well tolerated by infants, yet it contains fat globules of all sizes ranging from the smallest to the largest found in cow's milk. This seems to argue against the validity of the fat globule size theory of the relation between the state of fat in a milk and its quality in infant feeding.

Toughness and coarseness of curd have often been mentioned as qualities affecting the digestibility of milk. Curd of cow's milk is precipitated to a varying extent by hydrochloric acid, depending upon the breed of the cow. The precipitated curd from certain breeds is coarser than that from others. Hill has shown that the curds of milk from individual cows vary in toughness. This applies to all breeds.

[1] Deceased.

Toughness of curd remains fairly constant throughout the lactation period. Curd is somewhat tougher in the early stages of lactation and becomes softer toward the end. Toughness is not influenced by the fat content and there is no good evidence that the feed of the cow exerts any effect. The curd property, which is an individual characteristic of the cow, is believed to be an inheritable character. Hill found that milk with curds of varying toughness are not tolerated equally well by infants. Experience seems to have shown that an infant fed soft curd milk may thrive, whereas fed tough curd milk it may have digestive disturbances.

Milk is an almost complete food. Its proteins are of high quality. This means that they furnish a mixture of amino-acids in favorable quantitative relations for transmission into body proteins during growth. Its value may be enhanced by the addition of the sulphur-containing amino-acid cystine.

The carbohydrate lactose contributes about 29 per cent of all calories coming from milk. The fat of milk is especially important in that it is one of the few food fats containing vitamin A. The ash of milk is especially rich in calcium. Since all cereals, meats, eggs, roots, tubers, and fruits are deficient in this element, milk is an important supplementary food for providing calcium. The absolute amount of calcium which the daily diet of an infant or child should contain has been the subject of a number of investigations, but the question has not been satisfactorily answered. All experimenters are agreed that the calcium of milk is easier of assimilation than is this element from vegetables. Since in the diet of the infant and young child the calcium is derived largely from milk, the calcium requirements of the child will determine in great measure the content of milk in its food. It is generally agreed that all growing children up to the age of 14 should consume a liberal amount of milk in their daily diet unless there are specific contra-indications. The absolute amount of calcium daily retained by children increases as the milk in the diet is increased up to approximately 1 quart a day.

The most striking deficiency of milk is iron. Infants and young animals restricted to milk or milk and iron-poor foods for a considerable period develop anemia. Studies on blood regeneration have demonstrated that iron can not be utilized for hæmoglobin formation unless accompanied by a small amount of copper, and milk has been shown to be deficient in this element. The nutritional anemias which have been studied in animals have not been investigated thoroughly in infants, and so little can be said on this subject as respects human nutrition. The proportion of iron in the body is higher at birth than at any subsequent period. As the body grows in weight and size the proportion of iron decreases if the food is

deficient in iron, as is often the case in improperly fed infants and young children.

Milk fat is a good source of vitamin A and contains a small amount of both D and E. The nonfat portion of milk appears to be somewhat deficient in vitamin B, the antineuritic principle, but to contain more of the antipellagra principle, vitamin G. Raw milk always contains some of the antiscorbutic vitamin C. The studies of Macy have shown a pronounced deficiency of vitamin B in both human and cow's milks as to indicate the advisability of supplementing the diet of the infant at an early age with a source of this vitamin richer than milk. It is of great significance that the content of vitamin B in the milk can be markedly increased by including in the diet of a lactating mother foods rich in this principle.

The composition of milk may be varied by a number of conditions, among them the diet of the mother. Milk yield as well as composition may be so influenced. Overfeeding produces no change either in yield or composition of milk. Underfeeding produces significant changes, especially in an increase in the percentage of fat in the milk, but the yield tends to fall off. Raising the protein content of the food increases the quantity of milk produced. The quality as well as the quantity of protein of the food exerts complex effects upon milk composition. The inorganic constituents of milk remain fairly constant over relatively long periods even though the amounts of individual elements in the mother's diet vary within wide limits. Lactating animals remain for long periods in marked negative calcium-phosphorus balances while maintaining the normal milk yields. On diets deficient in these elements the mother therefore sacrifices herself to maintain the composition of the milk constant for the preservation of her young. Changes in the vitamin content of the diet influence directly the content of these nutrients in the milk rather than the amount of milk. The vitamin content of the milk may be decreased by deficient diets more readily than can be the content of any other milk constituent.

Colostrum, the fluid secreted by the mammary gland during the early days of lactation, differs from milk in the presence of certain cells known as colostrum bodies. It contains also a high content of globulin. These peculiarities in its composition have suggested that it has some special function in protecting the infant. Colostrum contains antibodies. The content of these parallels the amount of globulin. Certain species of young are susceptible to infectious diseases when colostrum is not given them, whereas the young fed from the breast immediately after birth remain free from such diseases. This has not been shown to apply to human subjects. In cattle and goats it appears especially that there is a transmission of immunity from mother to new-born young through the agency of colostrum,

but the latter appears to play a negligible rôle in the transmissio immunity in rats, guinea pigs, and rabbits. The belief prevails that colostrum is not essential to the infant, but scantiness of literature upon the subject and the contradictory findings of different workers make further investigations on this subject desirable.

This report includes in concise form the important facts concerning pasteurized milk, condensed milk, evaporated milk, powdered and dried milks, and malted milk, from the nutritional standpoint. There has been a growing tendency in recent years to pasteurize the milk supplies of cities. The percentage of milk pasteurized is far greater in large cities than in small cities, while villages and country districts still have generally only a raw milk supply. In 1924 the cities of over 500,000 population pasteurized 98.1 per cent of their milk, whereas cities of less than 10,000 pasteurized 33.6 per cent of their milk. Nearly all health authorities in this country are urging the pasteurization of market milk, since this prevents the dissemination of disease through this food.

The production of condensed milk has tended to decrease during recent years, but in 1928, 3,311,357 cases of 48 cans each were produced in the United States. Condensed milk contains about 42 per cent of sugar and 27.4 per cent of water. A number of investigators have shown that the vitamin content of condensed milk is practically the same as ordinary raw whole milk. This is evidently due to the fact that the evaporation is carried out in a vacuum so that there is little tendency to the oxidation of vitamin C.

Many investigations have established a low bacterial content of condensed milks, but they all contain some bacteria and molds. The development of these is inhibited by the high content of sugar and there is evidence that storage in sealed containers results in a decrease in the number of organisms which survive the canning process.

There has been a tendency in recent years away from the use of condensed milk in infant feeding, although many pediatricians still continue to use it in special cases. Its principal use is for household and culinary purposes and in bread making and the manufacture of ice cream.

While the production of condensed milk has tended to decrease, the production of evaporated milk steadily increased between the years 1912 and 1918. Since 1918 the annual production has ranged between 19,000,000 and 25,000,000 cases of 48 cans each. Evaporated milk has enjoyed increasing popularity in infant feeding in recent years.

In evaporated milk the antiscorbutic vitamin is completely destroyed. Otherwise the fat value of evaporated milk is not sufficiently different from fresh milk to warrant an unfavorable comparison. It is practically sterile bacteriologically and of superior digestibility.

Powdered whole milk manufacture has increased from about 4,000,000 pounds in 1918 to nearly 11,000,000 pounds in 1926. Powdered skim milk during the same period increased from 26,000,000 pounds to nearly 92,000,000 pounds. The total production of all dried milk products in 1927 amounted to 196,396,000 pounds. Dried milk is used as a general substitute for liquid milk, infant feeding, household and culinary purposes, and industrially in bread making, the manufacture of candy, confectionery, and ice cream. To some extent it is used in stock feeding.

From the standpoint of nutritive properties it may be said that dried milks manufactured by either the spray or roller processes compare very favorably in all respects except the antiscorbutic property with fresh milk.

RECOMMENDATIONS

Nothwithstanding the immense amount of research which has been done upon milk, there still remain a number of very important questions which require further study. Among these are the following:

1. Studies on curd tension, which is a measure of the toughness of the curd formed by rennet coagulation, seem to have established a unique value of soft curd milks in infant feeding. This property applies also to older children and adults whose digestive powers are not vigorous. Further confirmation of the work thus far done in feeding soft curd milks to infants is highly desirable.

It appears that the curd tension of milk can be greatly reduced—that is, the curd softened—by homogenization of milk, which is the breaking up of the fat globules into finer globules by mechanical means. It may thus prove feasible to render all milk soft curd milk and so improve its digestibility.

2. The vitamin content of milk, especially the water-soluble vitamins B and G, as determined by the biological assay, should be further studied. Such studies should be correlated with accurate determinations of the nutritive needs of the young for these vitamins.

3. A most important phase of nutritional research is that related to the biological values of proteins. Investigators have been much handicapped by their inability to secure considerable amounts of the 18 or more individual amino-acids into which proteins are digested. Very little progress has been made during the past 25 years in devising procedures for the isolation of amino-acids in pure form. Studies in this direction are highly desirable, and form a phase of research on the limiting factors in a chemical sense of milk as a food.

4. Further metabolism studies should be made on children to determine the optimum proportions of milk in the diet. The disagreement of experienced scientists and clinicians on this point emphasizes the need for information as to the proportions between milk

and other foods suitable for inclusion in the diet of infants and children which afford the optimum supplementary relations. Such studies should include calcium assimilation, the effect of the ratio of calcium to phosphorus, the adequacy of vitamins B and G in the diet, and the influence of the proportion of milk to other foods on the biological value of the total protein content of the food combination studied.

5. Further studies are recommended on the nature of the colostrum cell and its significance in the nutrition of the new-born.

6. The demonstration of Macy and coworkers of the nutritive deficiencies of human milks when produced by women whose diet is not satisfactory, and that the inclusion of certain vitamin-rich foods tends to markedly improve the quality of the milk, emphasizes the importance of further fundamental studies of this character.

7. There is need of further standardization of apparatus, installation, and operation of pasteurizing equipment in milk plants. A fundamental research on the several types of equipment for pasteurizing milk is recommended.

8. Since there are areas where milk could be economically produced but where no market is available near at hand, it appears economically desirable to increase the production of milk powders, evaporated milk, and condensed milk. From a standpoint of economy it is also imperative that the surplus milk during the flush season be preserved by one or another of these processes. A careful research on the economic aspects of replacement of liquid pasteurized milk or certified milk by milk powder, condensed, and evaporated milks is of importance.

9. Further study is needed by pediatricians of the specific conditions in which different kinds of milks (certified, pasteurized market, boiled, condensed, evaporated, milk powders, acidified milks, etc.) are indicated in infant feeding.

10. It is known that at least 10 inorganic elements are essential in the diet for normal nutrition. There are a number of inorganic elements present in minute amounts in the various foods including milk. Their significance, if any, is still unknown. Investigations to demonstrate which of these play a physiological rôle might yield important results.

11. Further studies are desirable on the chemistry of casein, its amino-acid composition and the supplementary relations of casein to other heat coagulable proteins of milk.

12. A study of the nutritive qualities of whey and whey powder. This product, now manufactured in small amounts, seems to possess, when taken in the right amounts, a mild regulatory action on the

intestinal tract which may make it desirable to recommend its wider use in nutrition.

Dr. E. V. McCollum, *Chairman.*
Dr. F. W. Schultz.
Dr. James A. Tobey.

Report of Subcommittee on Economic Aspects of Milk

I. CONSUMPTION OF FLUID MILK AND CREAM

Milk and the dairy industry are inseparably linked to the Nation's health and the normal growth and development of its people. Scientific studies have shown that the food people eat, especially during the periods of rapid growth in early childhood, has a lasting effect on the size of the entire race. President Hoover, when addressing The World's Dairy Congress in 1923, as Secretary of the Department of Commerce, said: "The exhaustive researches of nutritional science during the last two decades have, by the demonstration of the imperative need of dairy products for the special growth and development of children, raised this industry to one of the deepest national and community concern, for, as I have said, it is not alone the well-being of our people but it is the very growth and the virility of our race to which you contribute."

According to the latest figures available, the per capita consumption of fluid milk in 1926 in the United States was 55.3 gallons per year, or slightly more than 1 pint per day. In 1926, the most recent year for which figures are available, four European countries exceeded the United States in the per capita consumption of milk. These were Finland, with a consumption of 83.9 gallons; Switzerland, 70.4 gallons; Sweden, 69.7 gallons; and Norway, 56.0 gallons.

Nutrition experts state that for proper nutrition and health a normal growing child should receive approximately a quart of milk daily during the years of rapid growth, and that each adult should consume at least a quart of milk or its equivalent in butter, cheese, and ice cream.

Surveys have shown that the average child is getting considerably less than a quart of milk a day. On the average farm more milk is consumed per capita than in cities, though this is not true in certain specific localities. The increase in the per capita consumption of milk for the United States as a whole has been a gradual one. In 1921 the yearly per capita consumption was 49 gallons as compared with 55.3 gallons in 1926.

Doctor Sherman, of Columbia University, after extensive experiments, concluded that a child should receive a quart of milk per day to insure the optimum storage of calcium and phosphorus and the best development of bones and teeth. He also said that the calcium in

milk is superior to the calcium in vegetables as a source of that element for growing children.

Production in the United States is ample to care for future increases in consumption of fluid milk. If the per capita consumption should increase as much as 15 per cent, it would take only 55 per cent of the present total production. Such an increase in consumption of fluid milk would mean that it would be necessary to divert a part of the milk supply that now is used for manufacturing purposes into fluid milk markets. In June of this year the average price received at the farm for milk to be consumed as fluid milk, was $2.70 per hundredweight, as compared to $1.60 for milk sold to be manufactured into butter, cheese, and other products. If children, young people, and adults were consuming the quantity of milk required for proper nutrition and health, the diversion of this extra milk from butter, cheese, and other products to fluid-milk uses, could be accomplished very readily.

II. CONSUMPTION OF OTHER MILK PRODUCTS

The value of condensed and evaporated milk in place of fluid milk was fully demonstrated during and immediately after the World War. In 1919 the equivalent of more than 2,000,000,000 pounds of milk was exported to Europe in condensed, evaporated, or dried form.

Until recently, condensed, evaporated, and dried milk were consumed principally in sections where dairying had not been developed, or where geographic or climatic conditions made dairying impossible or unprofitable. In more recent years, these products have been sold in increasing amounts in home markets.

Physicians and dietitians have found evaporated and dried milk to be valuable in formulas for infant feeding. The use of these products in home cooking has increased also. Bakers and candy makers are using dried skimmed milk in their products, and ice cream manufacturers use dried skimmed milk as well as plain evaporated milk and sweet-cream unsalted butter.

Nearly 47 per cent of the milk produced in the United States is used as fluid milk or cream. The per capita consumption of milk in 1926 was 55.3 gallons; butter, 17.82 pounds; cheese, 4.36 pounds; condensed and evaporated milk, 14.32 pounds; and ice cream, 2.77 gallons. In 1928 our net imports of butter and cheese were 761,279 pounds of butter and 77,833,325 pounds of cheese. In the same year our exports of sweetened and unsweetened condensed milk exceeded our imports by 112,804,852 pounds, and our exports of dried milk exceeded our imports by 1,156,626 pounds. For the past few years the United States has been on an import basis.

III. PRODUCTION OF MILK

The amount of milk estimated to have been produced in the United States in 1926 was 120,766,000,000 pounds. Our principal milk-producing area extends from the New England and North Atlantic States in the East to Minnesota and the northern States of the Mississippi Valley on the west. Also in sections of the States of California, Oregon, and Washington dairying is carried on extensively.

Formerly intensive dairying was practiced only close to large centers of population, which required large quantities of milk for consumption as fluid milk. However, the geographic trend of dairying in the last few years has been toward the better soils of the Corn Belt and extending northwest into Wisconsin, Minnesota, and the Dakotas.

Conditions which are favorable to dairying are: Climate and soil suitable for growing corn for silage and legumes, especially alfalfa; fields of a size and contour suitable for power farming; farms close enough to centers of population so that they will be convenient to good markets; low priced, efficient labor, and good pastures with planty of rainfall.

The United States Department of Agriculture and the various State experiment stations have carried on enormous amounts of research work to reduce the cost of production through the breeding, selection, management, and feeding of dairy cattle. These studies have shown that there is a direct relation between the production per cow and income, and that the dairyman who uses modern methods in the elimination of the low-producing cows in his herd has the highest income.

Dairy herd improvement associations provide a very effective means for discovering low-producing cows. On January 1, 1930, there were 1,143 dairy herd improvement associations in the United States. In these associations there were 507,549 cows on test. This number of cows was 2.3 per cent of the total of 22,499,000 cows in the United States, as estimated by the United States Bureau of Agricultural Economics. In 1928 the average annual production of the cows in these associations was 7,464 pounds of milk, or 295 pounds of butterfat, which was 60 per cent greater than the average production for all the milk cows in the United States.

The rapid growth of dairying in the Corn Belt in the last few years promises to continue. There are good reasons why dairying should increase in this section. Corn and alfalfa grow there very well. Sweetclover fits into the cropping system. Power farming is entirely practical for raising crops. The region is far enough away from the industrial centers for labor to be obtained economically, yet close enough to provide markets for milk or its products.

Grain farms, especially the wheat-growing sections in the Red River Valley, are beginning to show signs of soil exhaustion. This condition is necessitating a change in the cropping system and the inclusion of the growing of cattle, either beef or dairy.

For many years State and Federal agencies have been making studies and investigations for the purpose of increasing efficiency in the production of milk, and there is no question but that milk can be produced at a lower cost by using the best-known methods. This would mean that fewer cows would be required for producing the Nation's milk supply.

IV. MARKETING

The majority of the market milk produced in the United States is sold in individual transactions between the producer and the processor or distributor. A portion is sold and delivered by the producer direct to the consumer. The rest is sold by what are known as fluid-milk marketing associations, which are cooperative organizations of producers. In 1928 these associations marketed about two-fifths of all the milk sold in the United States, a fraction valued at more than $325,000,000.

The period of greatest growth of these associations began during the World War. In general, the associations are of two types, depending on the kind of service rendered. One is the bargaining type and the other is the operating or marketing type. The operating or marketing association has in addition to the bargaining function, facilities for the physical handling of the milk. Some associations of the operating type have receiving stations in the country, where the milk is received, cooled, and shipped to dealers in the cities. Such stations may have facilities for manufacturing surplus milk into various dairy products.

Adjusting the production of milk to the consumptive demands is one of the most difficult problems connected with the marketing of milk, and various buying plans have been worked out for the purpose of equalizing production throughout the year as far as is possible. Under the so-called "basic surplus" plan each producer is assigned a definite volume of production, and for all milk produced in excess of this basic volume he receives a surplus or lower price. Each producer's basic quantity is usually determined by his average production during the previous October, November, and December, the period of the year when the supply and demand for market milk most nearly balances. If a producer produces say an average of 3,000 pounds for these three months, then 3,000 pounds represents the base for this producer for the year, and he will receive market milk prices for milk delivered each month up to his basic 3,000 pounds. For any milk over 3,000 pounds, he will receive a less price according to a

schedule worked out in the plan. Modifications of the plan to suit local conditions have been adopted by associations in different States.

The "contract plan" is a modification of the basic surplus plan designed to equalize the supply of milk throughout the year. Under this plan as used by the Connecticut Milk Producers' Association, the producer upon signing the contract previous to March 31 of any year states the quantity of milk he proposes to deliver daily for the next 12 months, beginning April 1. The producer is then penalized for production in excess of the amount specified or for shipping a less amount than that specified. The money collected from penalties does not go to the distributor but is pooled by the producers and prorated among producers in such a way that it is equivalent to a bonus received by the producers having even production.

In some cities, the producer or association receives one price for milk used as fluid milk and a lower price for any milk which has to be made up into by-products. Many cities and sections of the country consider the butterfat content in paying for fluid milk. Milk testing 3.5 or 4.0 per cent of butterfat may be taken as the base, with a differential used for figuring premiums to be paid for milk testing higher than the base or for cuts in the price for milk testing below the base. Also, in some sections premiums are paid to producers for maintaining certain conditions of sanitation in relation to their milk production.

V. TRANSPORTATION, PROCESSING, AND DELIVERY

The rapid growth of cities and the increases in the per capita consumption of milk have had the effect of enlarging the milk sheds from which many of the cities receive their milk. Improvement in motor trucks and roads and the introduction of tank trucks and tank cars, with modern means of insulation and refrigeration, have made it possible to extend the milk-producing areas.

The adoption of tank trucks and tank cars has stimulated the establishment of country receiving stations. In April, 1928, more than 75 per cent of Chicago's supply of milk was being shipped to that city by tank truck or tank car.

Tank trucks are used for routes covering 120 to 150 miles for the round trip, and tank cars make it entirely practical to extend a city's milk-shed beyond the 300 to 500-mile zone.

In Chicago, in 1925–26, it took approximately 51 cents of the consumer's dollar to pay for hauling the milk into the city, processing, bottling, and delivering it to the consumer. Forty-five cents of the consumer's dollar was received by the milk producer, and the balance, less than 4 cents, was net profit to the final distributor. Data tabulated by the Bureau of Dairy Industry of the United States Department of Agriculture in 1928 showed that the f. o. b. price of

milk in different cities ranged from 37.0 per cent of the retail price of milk (in Denver, Colo.), to 64.1 per cent (in Richmond, Va.).

A study made in Chicago in 1926 showed that the price received from the ultimate consumer for a quart of market milk averaged 12.9 cents. The farmer received 5.3 cents for this milk, leaving a gross margin of 7.5 cents per quart. Purchasing, receiving, and processing cost 2.2 cents per quart. It took 4.6 cents to sell and deliver the quart. General and administrative expenses amounted to 0.3 cent, and net income was not quite 0.5 cent per quart.

The grocery or general store has a limited function in supplying milk in most places. "Very few stores," according to Kelly and Clement, "will care to provide refrigeration and attend to the selling of the milk for less than 2 cents per quart. Therefore, the price that the consumer must pay at the store is usually as high as that delivered at his own door, and in special instances the price at the store is higher, even though the consumer comes to the store for the milk."

VI. SANITARY QUALITY OF MILK AND CREAM

The dairy industry could add millions of dollars to its annual receipts if only milk of the finest quality was produced. Ten or fifteen years ago this situation was accepted as inevitable, and it was difficult in some places to deliver sweet milk of good flavor to the market. As a result of years of constant work by agricultural and public health agencies, our farms and milk plants and their products are on a much higher plane of sanitation. This improvement has been brought about in a number of ways. For example, the United States Department of Agriculture has for more than 30 years been studying the question of dairy sanitation and methods of supplying the consumer with adequate and wholesome milk supplies. The State colleges of agriculture and agricultural experiment stations, State departments of agriculture, and other agencies, have been working effectively along this same line.

The California State Department of Agriculture has done one of the most effective pieces of dairy sanitation work. The State department of agriculture, because of its close touch with producers and manufacturers of dairy products, has an unusual opportunity to study methods of milk production and to devise practical and efficient methods for sanitary control. California is cited because it provides one of the best working examples of an economical State-wide program for the protection of the public health, improvement of the product, and the instruction of the dairy industry in the best known methods for the economical and sanitary production and processing of dairy products.

The United States Department of Agriculture and the various State agricultural colleges have the research and extension facilities and personnel not only to study questions of quality improvement, but to disseminate information on the subject among producers and manufacturers of the Nation. The department has outlined a program of quality improvement which can be, and is being, promoted by the State extension services in their work with adults and the boys and girls of the 4-H clubs. A number of States have already become interested in this program and are taking active steps to put it into effect. In 1929, through the cooperative extension work and the general distribution of information in printed and other forms, 78,552 farms improved their practice in the production and care of milk to make their product more sanitary. A number of other agricultural agencies and trade organizations have contributed to the raising of the general level of the quality of milk.

The modern trend of the dairy industry, in its steps to reduce losses through improperly produced milk and cream and to insure the consumer of an abundant supply of wholesome milk, is illustrated by some of the work that is being done by trade organizations. In 1929 seven dairy organizations which were conducting quality-control work on market milk and cream were studied by the United States Bureau of Dairy Industry. Five of these were producers' organizations and the other two were dairy councils. This quality-control work included routine inspection of dairy farms and instruction of dairymen in methods of producing milk of better quality. It also involved laboratory tests to determine the quality of the milk delivered by individual farmers. In one of the producers' associations 69 field men were employed for farm and country work, and in addition to this the organization employed 7 veterinarians and 16 laboratory workers. The cost of the quality-control work done by dairy organizations ranges from $6,000 to more than $250,000 per year per organization. Premiums ranging from 5 cents to 58 cents per 100 pounds have been paid for high-quality milk, and deductions ranging from 15 cents to 25 cents per 100 pounds have been made for lower quality.

Aside from agricultural agencies health organizations, both official and semiofficial, have done a vast amount of work in improving the milk supplies. Among the bodies which have worked on milk control are the United States Public Health Service; State, city, and county boards of health; the International Association of Dairy and Milk Inspectors; the American Public Health Association; the American Child Health Association; American Association of Medical Milk Commissions; and other similar agencies.

Reports gathered from city health departments in 1929 give tangible evidence of the improvement of the milk supplies.

The eradication program relative to bovine tuberculosis has a tremendous bearing on the economy of milk production and livestock raising as well as upon the public health. Systematic work along this line began only about 10 years ago, and far-reaching results have already been obtained. Three States—namely, Michigan, Maine, and North Carolina—have been declared free areas by virtue of the fact that this disease has been practically eliminated from these areas under State and Federal supervision.

The abortion disease of cattle is the cause of great losses to the dairy industry, and it may have a significance in relation to the public health where raw milk is consumed. Abortion in dairy cattle, as well as in other livestock, has been found to be closely associated with undulant fever in man. Elimination of the cows infected with this disease from the herd, through the test that has been worked out for this purpose, will remove this source of danger to the human family. It has been found that pasteurization will safeguard the milk supply from this disease. Legislation has been set up in 12 of the 48 States in efforts to control this disease in dairy cattle.

STATEMENTS AND RECOMMENDATIONS

1. The consumption of fluid milk in the United States is too low for proper and economical human nutrition. We are far below the optimum daily consumption of milk for the normal child. Every educational facility should be used to acquaint both adults and children with the desirability of consuming milk and dairy products in adequate amounts. Health agencies both official and voluntary, should more actively encourage greater use of high-quality milk as a nutritional and health protective program.

2. The present production of milk in the United States is ample to provide sufficiently for the optimum consumption of fluid milk on the basis of the present population. A large proportion of our properly supervised market-milk supply is of such quality that it can be recommended for human consumption.

3. Many dairy products and by-products, other than milk, are available in quantity and quality suitable for wider inclusion in the American diet. Some of the whole-milk products may be used in place of whole milk under certain conditions.

4. The prices of milk and other dairy products are reasonable, considering their exceptional food value and cost of production in comparison with other foodstuffs which make comparable demands as to care, expense, and service in production and merchandising. In order that milk of high quality shall be available on an equitable basis to consumers generally the price of milk to the producer should be based, in a general way, upon the market price of butterfat, plus

a sufficient additional amount to cover the additional costs necessary to produce and deliver milk that is high in quality.

5. Educational programs for raising the general level of quality of milk should be more extensively carried on through agricultural agencies thoroughly conversant with proper dairy practice and by the dairy industry itself. Such agencies are in intimate contact with every branch of the dairy industry. Unbalanced programs of dairy sanitation lead to undue costs in producing and processing milk. On the other hand, practical quality improvement work not only serves to protect health and welfare, but is a direct aid to the dairy industry through the elimination of financial losses and the widening of markets.

6. The future fluid-milk supply may come from greater distances from the point of consumption. Cheaper land, labor, and foods are usually available in sections away from large industrial centers. Local production should be encouraged to meet local demands; but where this is impossible, arrangements should be made for the proper shipment of high-quality milk and cream from a distance. To meet such a need, dairy manufacturing plants in strategic locations should be equipped to receive, cool, and ship milk and cream in a sanitary manner. Intensive sanitation work should be done with farmers delivering milk to processing plants. In this way, not only will the total supply of all dairy products be improved in quality, but larger quantities of milk of suitable quality will be available for shipment to city markets. The extension of country milk-receiving stations where milk is received, cooled, and shipped will expand milk-sheds, especially in the South and other sections where cooling on the farm is difficult to accomplish.

7. Every aid should be given to stimulate more economical and efficient milk production. This should expand research and extension along such lines as breeding, feeding, and management of dairy cattle; disease, parasite, and insect control in dairy herds; improvement of pastures and the raising, harvesting, and storing of crops, notably alfalfa, which are especially adapted to dairy farming.

8. Greater attention should be given to methods of transportation, terminal facilities, and warehousing of dairy products for the elimination of waste and improvement of quality.

9. It is essential that milk production be better adjusted to consumption throughout the year, to prevent the seasonal surpluses which tend to disorganize markets. Extension of a rational surplus plan of milk buying will do much to remedy this condition.

10. There should be a more widespread and uniform system of buying milk on the basis of butterfat content and sanitary quality. Payment for additional butterfat over the basic varies from 30 cents to $1.09 per pound in market-milk centers. In many cases at present the differential is far too low to warrant the additional cost

of producing additional fat, while in others the financial penalty is too severe for milk lower in fat. Clean milk of low bacterial count costs more to produce and is of greater value to plant operators and consumers. As yet the additional payment for high quality is not widely made. An extension of this system will result in rapid improvement of quality generally.

11. It is possible to reduce the cost of processing, bottling, and delivering milk. Studies have shown that many milk plants can make decided improvement in plant arrangement for efficiency, better utilization of labor, and the curtailment of material losses, such as those represented by spilled or wasted milk, broken milk bottles, poorly utilized steam, power, and refrigeration.

12. The production and processing of milk usually are more sanitary and more economical in those plants which handle sufficient volumes of milk to enable them to have ample equipment of the best machinery and skilled technicians and labor, and use the best methods, and operate at or near capacity. Furthermore, the centralization of the milk industry makes it easier to carry on the work of inspection and control.

O. E. Reed, *Chairman.*
C. E. Gray.
Frederic Howe.

General Conclusions and Recommendations

Among certain peoples, infants and children have been reared without a milk supply after the weaning period. Many such children tend to suffer for a few years because the adult type of diet is not suitable for the young child. Prolonged breast feeding is the custom in such places and there is a far greater health hazard to the child after weaning if cow's milk is not provided. In a country such as the United States, where it is economically and agriculturally desirable to produce milk in abundance, it is a sound policy from the physiological point of view to include a liberal amount of milk in every child's diet. Therefore, an adequate supply of safe, good-quality milk should be available for all children. The best information available indicates that approximately a quart of milk, or its equivalent in other dairy products, is desirable daily for the average growing child; but the average child receives considerably less than this amount.

Further research should be conducted to add to the existing knowledge of the nutritional value of milk and milk products. A number of researches in this field are suggested in the report of the subcommittee on the nutritional aspects of milk. Adequate facilities should be provided for researches.

There is ample evidence that milk is an important factor in the transmission of certain communicable diseases unless it is properly produced, processed, and distributed. A study of the reported outbreaks of communicable diseases attributable to milk in the United States indicates that the largest number occur in the smaller communities in many of which the milk supply is not properly supervised and in which the percentage of milk pasteurized is small.

From a study of these outbreaks attributed to dairy products, it appears that improperly supervised fluid milk has been the most frequent offender in the transmission of disease, and that ice cream, cheese, and butter are minor offenders. The latter will, in the future, probably become even less significant in this respect. No evidences were found to indicate that milk powder, condensed milk, or evaporated milk are significant communicable disease vectors.

There is need for further improvement in the public health and quality supervision of the milk supply of this country.

The supervision of milk, cream, and other dairy products is of vital public health concern and economic importance, and should receive the coordinated attention of all State and local agencies, including public health authorities, agricultural departments, and agricultural, educational, and extension organizations within the State or community.

Laws or regulations for the supervision of milk supplies, whether local, State, or Federal, should incorporate in so far as practicable uniform requirements at least the equivalent of those contained in a milk ordinance to be recommended by the United States Public Health Service and the Bureau of Dairy Industry of the United States Department of Agriculture. It is fundamental that all milk supplies should be surveyed and rated as frequently as practicable. Inasmuch as the laws and regulations relating to the public-health supervision of milk supplies deal only with measures which are designed primarily to protect the public health, they should, when practicable, be made the function of health authorities, local, State, and Federal. The public-health supervision of municipal milk supplies should obviously be the function of governmental departments primarily dedicated to the public health point of view and technically trained in the recognition of all public health aspects of the problem.

In the absence of local milk control, the State must assume this responsibility.

Health authorities should recommend to American milk consumers that the general market milk be pasteurized before it is consumed, either in a properly supervised pasteurization plant or at home.

Milk should be bought and sold on a quality basis in order to reward and stimulate good quality.

In order that the supervision of milk and milk products may become general, and in order to educate the people as to the importance of adequate milk consumption, the Federal Government should prepare and institute a coordinated program of education and supervision, and the States which have not already done so are urged to develop and put into operation a program coordinated with the Federal program.

DEATHS DURING WEEK ENDED MARCH 14, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended March 14, 1931, and corresponding week of 1930. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)

	Week ended Mar. 14, 1931	Corresponding week, 1930
Policies in force	75, 096, 936	75, 564, 251
Number of death claims	16, 248	15, 738
Death claims per 1,000 policies in force, annual rate	11. 3	10. 9

Deaths[1] *from all causes in certain large cities of the United States during the week ended March 14, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Mar. 14, 1931				Corresponding week, 1930		Death rate[2] for first 11 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1931	1930
Total (81 cities)	9, 420	13. 8	849	[4] 67	13. 2	863	14. 1	13. 3
Akron	52	10. 5	7	69	8. 4	10	8. 5	8. 8
Albany[5]	81	12. 5	3	59	15. 1	6	15. 2	16. 6
Atlanta	110	20. 7	20	204	17. 7	9	17. 1	17. 6
White	55		7	111		3		
Colored	55	(6)	13	373	(6)	6	(6)	(6)
Baltimore[5]	297	19. 0	30	102	16. 3	18	17. 7	15. 7
White	227		21	91		9		
Colored	70	(6)	9	141	(6)	9	(6)	(6)
Birmingham	82	15. 9	6	60	15. 5	4	15. 1	14. 5
White	44		4	69		0		
Colored	38	(6)	2	49	(6)	4	(6)	(6)
Boston	218	14. 5	19	54	16. 4	26	17. 2	15. 9
Bridgeport	83	11. 7	1	17	14. 2	1	13. 5	14. 3
Buffalo	170	15. 3	15	61	13. 7	12	15. 3	14. 4
Cambridge	26	11. 9	1	20	14. 2	5	14. 3	14. 0
Camden	44	19. 3	8	139	19. 3	6	18. 8	15. 0
Canton	31	15. 1	0	0	11. 4	2	11. 3	11. 9
Chicago[5]	745	11. 2	79	70	11. 8	83	12. 2	11. 8
Cincinnati	142	16. 2	4	24	18. 9	12	18. 0	17. 7
Cleveland	245	14. 0	19	55	11. 9	27	12. 5	12. 4
Columbus	91	16. 1	4	39	12. 5	5	14. 9	15. 1
Dallas	67	12. 8	7		7. 9	6	12. 5	12. 8
White	48		5			5		
Colored	19	(6)	2		(6)	1	(6)	(6)
Dayton	58	14. 6	0	0	12. 4	2	14. 1	10. 6
Denver	94	16. 8	9	87	13. 4	5	16. 1	15. 6
Des Moines	43	15. 5	2	35	15. 7	3	12. 5	13. 8
Detroit	305	9. 6	41	65	10. 9	64	9. 7	10. 5
Duluth	14	7. 2	0	0	14. 4	3	12. 3	11. 7

(Footnotes at end of table)

Deaths[1] *from all causes in certain large cities of the United States during the week ended March 14, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*—Continued

City	Week ended Mar. 14, 1931				Corresponding week, 1930		Death rate [2] for first 11 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
El Paso	27	13.4	5		16.2	2	19.8	18.8
Erie	21	9.8	3	56	10.8	4	11.2	11.3
Fall River [5] [7]	33	14.9	3	68	11.8	1	13.8	13.9
Flint	32	10.2	7	89	10.6	5	8.2	10.3
Fort Worth	46	14.8	5		8.9	2	11.7	12.5
White	42		5			2		
Colored	4	[6]	0		[6]	0	[6]	[6]
Grand Rapids	41	12.5	1	15	10.8	3	9.8	11.8
Houston	69	11.6	7		12.9	7	12.2	13.5
White	50		6			5		
Colored	19	[6]	1		[6]	2	[6]	[6]
Indianapolis	114	16.1	5	41	14.4	3	15.5	16.5
White	91		5	47		2		
Colored	23	[6]	0	0	[6]	1	[6]	[6]
Jersey City	89	14.5	16	142	13.3	6	14.1	12.8
Kansas City, Kans	39	16.5	7	144	12.4	3	16.7	12.9
White	26		5	123		3		
Colored	13	[6]	2	254	[6]	0	[6]	[6]
Kansas City, Mo	135	17.2	9	68	14.7	7	15.7	14.4
Knoxville	42	20.1	2	43	13.7	3	14.6	14.8
White	38		2	48		3		
Colored	4	[6]	0	0	[6]	0	[6]	[6]
Long Beach	27	9.2	2	48	9.4	0	10.6	10.5
Los Angeles	299	11.8	19	55	10.4	16	12.2	12.2
Louisville	215	36.4	15	129	11.7	2	18.9	14.4
White	161		10	98		2		
Colored	54	[6]	5	331	[6]	0	[6]	[6]
Lowell [7]	31	16.0	6	153	20.7	7	14.9	16.0
Lynn	27	13.7	2	52	12.2	2	12.8	12.9
Memphis	122	24.6	11	116	20.3	7	18.3	17.8
White	62		4	67		1		
Colored	60	[6]	7	203	[6]	6	[6]	[6]
Miami	42	19.5	2	51	12.2	2	14.9	13.4
White	31		0	0		1		
Colored	11	[6]	2	177	[6]	1	[6]	[6]
Milwaukee	127	11.2	17	74	9.3	12	10.7	10.9
Minneapolis	102	11.2	19	122	8.7	2	12.4	11.6
Nashville	51	17.1	4	60	17.9	6	18.4	16.9
White	35		3	60		6		
Colored	16	[6]	1	59	[6]	0	[6]	[6]
New Bedford [7]	20	9.3	2	53	15.3	4	13.4	12.5
New Haven	56	18.0	0	0	15.1	1	13.7	15.2
New Orleans	157	17.5	14	77	17.1	9	19.9	19.9
White	96		6	50		5		
Colored	61	[6]	8	130	[6]	4	[6]	[6]
New York	1,680	12.4	140	58	12.6	179	13.8	12.1
Bronx Borough	209	8.2	17	39	8.9	22	10.0	8.6
Brooklyn Borough	590	11.7	58	61	12.3	71	12.8	11.3
Manhattan Borough	667	19.1	46	78	17.7	61	21.0	17.9
Queens Borough	168	7.6	14	38	8.2	19	9.1	7.9
Richmond Borough	46	14.7	5	90	17.7	6	14.8	15.5
Newark, N. J	119	13.9	13	68	12.9	12	14.2	14.4
Oakland	66	11.8	2	26	13.0	7	12.3	12.5
Oklahoma City	47	12.5	8	110	8.9	3	11.7	10.5
Omaha	45	10.8	2	22	12.6	4	15.0	14.5
Paterson	47	17.7	1	17	12.4	4	16.0	13.5
Philadelphia	568	15.1	64	93	14.4	46	16.8	13.9
Pittsburgh	270	20.8	30	104	17.6	27	18.8	15.9
Portland, Oreg	71	12.1	1	12	15.8	8	13.0	14.1
Providence	60	12.3	7	65	13.2	6	15.7	15.6
Richmond	67	19.0	5	73	18.2	1	18.1	17.0
White	41		3	66		1		
Colored	26	[6]	2	87	[6]	0	[6]	[6]
Rochester	93	14.6	9	82	15.1	6	14.1	13.0
St. Louis	258	16.2	18	61	14.5	22	18.6	15.2
St. Paul	71	13.4	3	31	9.6	4	11.3	11.4
Salt Lake City [5]	43	15.7	2	30	9.6	0	13.1	14.0
San Antonio	67	14.6	7		18.1	12	15.4	19.4
San Diego	32	10.7	2	41	16.4	3	15.9	16.2
San Francisco	177	14.2	8	53	14.1	7	15.1	14.4

(Footnotes at end of table.)

Deaths [1] from all causes in certain large cities of the United States during the week ended March 14, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended Mar. 14, 1931				Corresponding week, 1930		Death rate [2] for first 11 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Schenectady	16	8.7	3	88	17.4	3	11.6	11.7
Seattle	110	15.4	3	28	14.1	12	13.1	12.0
Somerville	20	9.9	2	74	12.0	3	11.8	12.7
South Bend	12	5.8	0	0	8.4	2	9.1	10.1
Spokane	26	11.7	4	104	11.3	2	13.0	13.4
Springfield, Mass	50	17.1	7	107	19.1	10	14.7	15.0
Syracuse	37	9.1	4	47	13.9	3	13.0	13.4
Tacoma	38	18.4	7	180	13.2	2	15.7	13.1
Toledo	77	13.6	4	37	16.3	5	13.4	14.4
Trenton	44	18.5	3	52	17.7	5	20.1	18.7
Utica	30	15.3	2	52	14.8	6	16.5	15.7
Washington, D. C	154	16.3	10	55	15.7	18	18.6	16.1
White	101		4	33		10		
Colored	53	(6)	6	103	(6)	8	(6)	(6)
Waterbury	26	13.4	5	151	15.1	4	11.5	11.8
Wilmington, Del.[7]	32	15.7	3	65	15.2	3	16.6	16.1
Worcester	44	11.6	3	41	13.9	3	15.1	15.7
Yonkers	18	6.8	1	26	7.7	2	10.5	9.1
Youngstown	43	13.0	8	112	9.2	4	11.8	11.0

[1] Deaths of nonresidents are included. Still births are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 76 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows. Atlanta, 31, Baltimore, 15, Birmingham, 39; Dallas, 15, Fort Worth, 14, Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31, Nashville, 30, New Orleans, 26, Richmond, 32, and Washington, D. C., 25.
[7] Population Apr. 1, 1930, decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended March 21, 1931, and March 22, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended March 21, 1931, and March 22, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Mar. 21, 1931	Week ended Mar. 22, 1930	Week ended Mar. 21, 1931	Week ended Mar. 22, 1930	Week ended Mar. 21, 1931	Week ended Mar. 22, 1930	Week ended Mar. 21, 1931	Week ended Mar. 22, 1930
New England States:								
Maine	1		51	6	71	31	0	2
New Hampshire		3	2	7	23	29	0	0
Vermont	2				9	18	0	0
Massachusetts	52	68	9	13	500	862	1	7
Rhode Island	6	4	6		8	2	0	0
Connecticut	6	20	17	9	794	16	2	2
Middle Atlantic States.								
New York	124	126	[1] 47	[1] 40	1,901	961	18	21
New Jersey	52	146	51	15	687	788	5	11
Pennsylvania	101	159			3,503	1,297	8	21
East North Central States:								
Ohio	43	28	55	12	[illegible]	720	3	4
Indiana	25	24	34		654	84	7	14
Illinois	106	164	64	44	1,680	662	12	10
Michigan	42	66	79	8	147	995	14	24
Wisconsin	13	14	78	30	314	835	1	4
West North Central States.								
Minnesota	20	14	1	4	112	292	2	3
Iowa	4	6			20	462	2	1
Missouri	29	37	65	9	349	145	15	13
North Dakota		5			11	26	0	1
South Dakota	11	1		2	80	109	0	0
Nebraska	11	12	3		7	594	0	4
Kansas	24	13	34	1	24	557	0	3
South Atlantic States:								
Delaware	3	4	2	1	120	18	0	0
Maryland [2]	11	21	99	36	1,228	19	1	1
District of Columbia	11	18	5		223	1	5	0
West Virginia	14	21	95	22	58	97	1	2
North Carolina [3]	17	33	118	36	698	25	5	2
South Carolina	17	14	1,088	914	127		1	4
Georgia	10	6	630	128	151	221	1	10
Florida	14	7	83	2	289	388	3	0
East South Central States.								
Kentucky					415	217	3	2
Tennessee	4	7	292	95	197	287	1	52
Alabama	13	22	402	171	543	312	18	6
Mississippi	12	10					2	11
West South Central States:								
Arkansas	7	8	285	68	35	17	2	10
Louisiana	19	18	84	27	38	122	5	2
Oklahoma [4]	17	16	120	54	24	435	0	3
Texas	17	34	133	26	71	129	1	4
Mountain States:								
Montana	3	3			8	33	0	3
Idaho	1		2		4	28	0	2
Wyoming		1	3		5	10	0	0
Colorado	5	10			166	347	2	2
New Mexico	4	8	6	1	96	122	2	2
Arizona	1	7	12	8	132	30	5	4
Utah [2]	1	4	15		2	186	2	5
Pacific States:								
Washington	5	3	1		40	269	1	9
Oregon	6	11	204	58	86	52	0	1
California	48	54	430	34	1,378	1,901	4	13

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, 1931, 1 case in North Carolina.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

***Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended March 21, 1931, and March 22, 1930*—Continued**

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Mar. 21, 1931	Week ended Mar. 22, 1930	Week ended Mar. 21, 1931	Week ended Mar. 22, 1930	Week ended Mar. 21, 1931	Week ended Mar. 22, 1930	Week ended Mar. 21, 1931	Week ended Mar. 22, 1930
New England States:								
Maine	0	0	43	52	0	0	1	0
New Hampshire	0	0	1	23	0	0	0	0
Vermont	0	0	8	12	0	1	0	0
Massachusetts	0	0	409	269	0	0	3	0
Rhode Island	0	0	49	20	0	0	0	0
Connecticut	0	0	54	139	0	0	0	1
Middle Atlantic States:								
New York	0	1	923	627	1	16	5	18
New Jersey	0	0	313	308	0	0	2	6
Pennsylvania	2	0	555	547	0	3	9	10
East North Central States:								
Ohio	1	0	398	247	46	174	6	4
Indiana	5	0	340	161	113	144	1	0
Illinois	1	0	567	624	39	139	5	6
Michigan	0	2	439	320	20	79	10	4
Wisconsin	1	0	156	170	6	24	0	4
West North Central States:								
Minnesota	0	2	96	142	5	10	0	6
Iowa	1	0	120	90	80	87	1	2
Missouri	0	0	349	114	55	72	3	2
North Dakota	1	0	12	24	4	10	1	3
South Dakota	0	0	25	16	27	41	0	1
Nebraska	0	1	45	87	82	45	2	0
Kansas	3	0	69	135	106	110	0	5
South Atlantic States:								
Delaware	0	0	25	12	0	0	0	3
Maryland [1]	0	0	78	99	0	0	2	7
District of Columbia	0	1	32	26	0	0	1	0
West Virginia	0	0	18	45	11	29	2	11
North Carolina [3]	0	0	62	39	0	15	1	1
South Carolina	0	0	10	23	0	0	2	12
Georgia	1	1	110	24	0	0	15	7
Florida	0	0	5	11	0	0	1	0
East South Central States:								
Kentucky	0	0	58	39	14	20	1	2
Tennessee	0	2	37	70	16	10	4	18
Alabama	1	1	29	28	8	2	7	18
Mississippi	0	0	23	13	24	0	3	4
West South Central States								
Arkansas	0	0	23	11	22	39	4	4
Louisiana	0	0	23	27	24	1	5	15
Oklahoma [4]	0	1	40	33	62	86	2	4
Texas	0	0	23	58	54	35	2	0
Mountain States:								
Montana	0	0	20	42	6	9	2	0
Idaho	0	0	7	7	1	11	0	2
Wyoming	0	0	35	2	4	5	0	0
Colorado	0	0	59	20	3	9	0	7
New Mexico	1	0	12	20	4	3	2	0
Arizona	0	0	9	36	9	41	0	1
Utah [1]	0	0	16	6	1	0	0	0
Pacific States:								
Washington	0	0	51	61	57	71	2	6
Oregon	1	0	17	44	43	21	2	1
California	1	2	125	182	32	67	6	8

[1] Week ended Friday.
[3] Typhus fever, 1931, 1 case in North Carolina.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
January, 1931										
Hawaii Territory	8	21	10		86		0	3	0	6
February, 1931										
Idaho	14		19					87	0	20
Illinois	43	533	1,136	2	4,484		6	1,910	228	13
Louisiana	11	174	707	13	14	75	5	100	120	35
Maine	1	18	350		103	1	0	134	0	4
Maryland	4	87	3,417		2,063		1	453	0	12
Michigan	29	163	658		778		3	1,556	142	17
Minnesota	4	55	38		205		8	401	43	10
Missouri	38	181	658	8	3,692		0	1,339	257	13
New York	63	456		5	3,477		7	3,326	38	38
Ohio	19	214	1,575	1	1,881		21	2,220	239	38
Porto Rico		27	340	2,768	49	5	0		0	17
Rhode Island		40	63		14		0	246	0	4
West Virginia	3	45	706		251		4	87	44	10

January, 1931

	Cases
Hawaii Territory:	
Chicken pox	26
Conjunctivitis, follicular	53
Dysentery (amebic)	1
Dysentery (bacillary)	1
Hookworm disease	1
Leprosy	9
Mumps	77
Ophthalmia neonatorum	1
Trachoma	1
Tuberculosis, pulmonary	75
Tuberculosis, other forms	14

February, 1931

	Cases
Chicken pox:	
Illinois	1,543
Louisiana	65
Maine	204
Maryland	874
Michigan	1,328
Minnesota	639
Missouri	510
New York	2,445
Ohio	2,360
Porto Rico	20
Rhode Island	99
West Virginia	305
Conjunctivitis.	
Illinois	3
Maine	1
Dengue:	
Porto Rico	8
Diarrhea:	
Maryland	5
Diarrhea and enteritis (under 2 years):	
Ohio	10
Dysentery:	
Illinois	10
Illinois (amebic)	4
Louisiana	1
New York	13
Porto Rico	14
Filariasis	
Porto Rico	3
Food poisoning:	
Ohio	4
German measles.	
Illinois	38
Maine	6
Maryland	208
New York	462
Ohio	39
Rhode Island	6
Hookworm disease:	
Louisiana	208
Impetigo contagiosa:	
Maryland	7
Jaundice·	
Maryland	18
Lead poisoning:	
Illinois	9
Ohio	4
Leprosy:	
Michigan	1
Lethargic encephalitis:	
Illinois	6
Louisiana	2
Maine	1
Michigan	7
Minnesota	3
New York	15
Ohio	4

Disease and State	Cases
Mumps:	
Illinois	1,392
Louisiana	9
Maine	285
Maryland	225
Michigan	573
Missouri	154
New York	1,428
Ohio	1,067
Porto Rico	2
Rhode Island	84
Ophthalmia neonatorum:	
Illinois	4
Louisiana	2
Missouri	1
New York	3
Ohio	77
Porto Rico	7
Paratyphoid fever:	
Maine	2
Minnesota	1
New York	2
Porto Rico	7
Puerperal septicemia.	
New York	11
Ohio	7
Porto Rico	14
Rabies in animals:	
Illinois	4
Louisiana	17
Maryland	2
Missouri	4
New York	3
Rhode Island	1
Scabies	
Maryland	55
Septic sore throat:	
Illinois	8
Maryland	21
Michigan	19
Missouri	24
New York	16
Ohio	96
Rhode Island	3
Tetanus	
Illinois	1
Louisiana	1
Maryland	2

Disease and State	Cases
Tetanus—Continued.	
Ohio	1
Porto Rico	5
Tetanus, infantile:	
Porto Rico	15
Trachoma:	
Illinois	5
Missouri	8
Ohio	1
Porto Rico	2
Trichinosis:	
Illinois	3
New York	6
Tularaemia:	
Illinois	4
Louisiana	5
Maryland	1
Minnesota	3
Missouri	3
New York	2
Ohio	5
Undulant fever.	
Illinois	5
Louisiana	7
Maine	1
Michigan	2
Minnesota	6
Missouri	3
New York	18
Ohio	13
Vincent's angina:	
Maine	5
Maryland	10
New York[1]	88
Whooping cough.	
Illinois	419
Louisiana	24
Maine	229
Maryland	123
Michigan	777
Minnesota	216
Missouri	103
New York	1,875
Ohio	421
Porto Rico	175
Rhode Island	55
West Virginia	220
Yaws:	
Porto Rico	3

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 94 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 32,170,000. The estimated population of the 87 cities reporting deaths is more than 30,625,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

[1] Exclusive of New York City.

Weeks ended March 14, 1931, and March 15, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	999	1,423	
94 cities	410	604	826
Measles			
45 States	17,670	13,297	
94 cities	5,636	3,946	
Meningococcus meningitis:			
46 States	189	247	
94 cities	77	106	
Poliomyelitis:			
46 States	19	19	
Scarlet fever.			
46 States	6,239	5,480	
94 cities	2,318	1,965	1,538
Smallpox			
46 States	895	1,551	
94 cities	125	155	60
Typhoid fever.			
46 States	97	152	
94 cities	19	33	26
Deaths reported			
Influenza and pneumonia:			
87 cities	1,311	979	
Smallpox			
87 cities	0	0	

City reports for week ended March 14, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	9	1	2		4	2	18	4
New Hampshire:								
Concord	0	0	1		0	0	0	0
Manchester	0	0	0		1	3	0	1
Vermont:								
Barre	3	0	0		0	0	0	0
Burlington	0	0	1		0	0	0	1
Massachusetts:								
Boston	79	34	17	13	2	105	24	23
Fall River	1	4	1	1	1	0	11	2
Springfield	0	4	2		1	2	1	1
Worcester	6	3	1		0	4	10	4
Rhode Island:								
Pawtucket	10	1	0		0	2	0	4
Providence	20	8	2		4	0	3	5
Connecticut:								
Bridgeport	1	6	0	5	3	0	4	4
Hartford	6	5	7	1	0	36	0	7
New Haven	41	1	0		0	409	18	7

City reports for week ended March 14, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MIDDLE ATLANTIC								
New York:								
Buffalo	26	12	7	5	1	288	78	25
New York	374	222	91	42	22	1,032	59	255
Rochester	3	7	0	-----	1	2	4	9
Syracuse	17	4	0	-----	0	10	0	4
New Jersey:								
Camden	3	6	8	1	0	36	8	11
Newark	118	15	17	12	0	4	15	13
Trenton	3	3	1	13	1	2	3	9
Pennsylvania:								
Philadelphia	155	65	14	14	12	722	59	83
Pittsburgh	114	18	11	13	14	70	47	66
Reading	11	2	1	-----	0	129	31	4
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	13	9	2	10	0	91	25	0
Cleveland	-----	27	-----	-----	-----	-----	-----	-----
Columbus	17	3	1	5	6	4	2	14
Toledo	50	5	9	7	7	1	35	16
Indiana:								
Fort Wayne	6	3	3	-----	0	46	0	4
Indianapolis	68	6	2	-----	1	278	19	26
South Bend	1	3	0	-----	0	1	0	2
Terre Haute	1	0	0	-----	4	1	0	3
Illinois:								
Chicago	100	92	73	14	14	162	59	79
Springfield	-----	0	-----	-----	-----	-----	-----	-----
Michigan:								
Detroit	113	46	21	29	7	10	55	40
Flint	16	2	1	53	0	2	9	10
Grand Rapids	5	1	0	1	1	0	1	0
Wisconsin:								
Kenosha	14	0	0	-----	0	0	87	0
Madison	40	0	0	-----	-----	0	54	-----
Milwaukee	147	14	8	6	5	53	541	8
Racine	11	1	3	2	1	5	3	1
Superior	16	0	0	-----	0	1	0	2
WEST NORTH CENTRAL								
Minnesota:								
Duluth	13	0	0	-----	0	0	2	3
Minneapolis	85	14	2	-----	6	70	106	13
St. Paul	55	6	0	-----	2	4	1	5
Iowa:								
Davenport	0	0	0	-----	-----	0	0	-----
Des Moines	5	1	0	-----	-----	0	7	-----
Sioux City	18	1	0	-----	-----	9	19	-----
Waterloo	3	1	0	-----	-----	0	0	-----
Missouri:								
Kansas City	43	5	6	-----	1	90	1	16
St. Joseph	2	1	3	-----	0	0	0	2
St. Louis	20	39	15	1	4	130	19	-----
North Dakota:								
Fargo	9	0	0	-----	1	0	9	0
Grand Forks	2	0	3	-----	-----	0	2	-----
South Dakota:								
Aberdeen	4	0	0	-----	-----	1	0	-----
Sioux Falls	0	1	0	-----	-----	0	0	-----
Nebraska:								
Omaha	31	3	6	-----	0	4	18	9
Kansas:								
Topeka	42	2	0	2	3	0	26	0
Wichita	10	2	1	-----	0	4	0	6
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	2	1	-----	0	18	3	3
Maryland:								
Baltimore	136	23	11	24	8	788	54	68
Cumberland	0	1	0	-----	0	0	0	7
Frederick	0	0	0	-----	0	4	0	1
District of Columbia:								
Washington	47	12	6	2	0	153	0	15

City reports for week ended March 14, 1931—**Continued**

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
SOUTH ATLANTIC—con.								
Virginia:								
Lynchburg	28	2	2		0	6	2	1
Norfolk	6	1	0		0	27	8	2
Richmond	3	3	2		2	209	0	7
Roanoke	14	1	0		0	0	0	1
West Virginia:								
Charleston	4	0	0	5	1	0	0	6
Wheeling	18	1	0	2	3	1	0	3
North Carolina:								
Raleigh	21	0	2		0	25	0	1
Wilmington	9	0	0	1	0	3	0	4
Winston-Salem	3	1	0	2	0	8	8	4
South Carolina:								
Charleston	1	0	0	111	2	49	0	12
Columbia	4	0	1		0	0	1	10
Greenville	0	0	0		0	0	0	0
Georgia:								
Atlanta	0	3	0	202	9	32	0	13
Brunswick	0	0	0		0	0	26	1
Savannah	4	0	1	6	1	0	11	6
Florida:								
Miami	5	3	2		1	3	0	0
St. Petersburg		0			0			1
Tampa	4	1	1	2	3	98	1	5
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	1	0		0	13	0	2
Tennessee:								
Memphis	45	4	2		7	75	3	18
Nashville	2	1	0		3	19	0	6
Alabama:								
Birmingham	4	2	4	53	5	90	1	11
Mobile	2	1	0		1	0	1	1
Montgomery	11	1	0	5		0	1	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	0			1	0	
Little Rock	2	0	0	2	0	1	9	8
Louisiana:								
New Orleans	10	14	11	2	4	0	0	25
Shreveport	3	0	0		0	0	0	4
Oklahoma:								
Tulsa	10	1	1			5	0	
Texas:								
Dallas		5						
Fort Worth	11	3	4		2	0	0	4
Galveston	0	1	0		0	0	0	3
Houston	6	5	3		1	2	5	7
San Antonio	4	2	2		8	4	0	3
MOUNTAIN								
Montana:								
Billings	4	0	0		0	0	0	0
Great Falls	8	0	0		0	0	0	0
Helena	1	0	0		0	0	0	0
Missoula	0	0	0		0	0	1	0
Idaho:								
Boise	1	0	0		0	0	0	2
Colorado:								
Denver	68	8	2		3	35	34	16
Pueblo		1						
New Mexico:								
Albuquerque	0	0	0	1	0	0	0	0
Arizona:								
Phoenix	3	0	0	1	0	1	0	2
Utah:								
Salt Lake City	7	2	0		0	0	5	8
Nevada:								
Reno	0	1	1	1	0	0	0	1

City reports for week ended March 14, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
PACIFIC								
Washington:								
Seattle	36	4	4	----------	----------	3	15	----------
Spokane	14	2	0	----------	----------	8	0	----------
Tacoma	0	1	0	----------	4	0	0	4
Oregon:								
Portland	39	7	0	29	2	22	16	10
Salem	1	0	1	2	----------	1	12	----------
California:								
Los Angeles	95	39	19	146	5	161	11	20
Sacramento	11	1	1	43	2	4	3	17
San Francisco	60	15	4	144	4	6	14	11

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	4	21	0	0	0	2	0	0	0	22	27
New Hampshire:											
Concord	1	0	0	0	0	0	0	0	0	0	6
Manchester	2	1	0	0	0	0	0	0	0	0	16
Vermont:											
Barre	0	0	0	0	0	2	0	0	0	7	5
Burlington	0	1	0	0	0	0	0	0	0	0	9
Massachusetts:											
Boston	85	136	0	0	0	9	1	0	0	34	218
Fall River	4	6	0	0	0	3	0	0	0	3	33
Springfield	10	7	0	0	0	1	0	0	0	2	28
Worcester	10	22	0	0	0	3	0	0	0	8	44
Rhode Island:											
Pawtucket	1	34	0	0	0	0	0	0	0	1	24
Providence	12	0	0	0	0	5	0	0	0	5	60
Connecticut:											
Bridgeport	12	10	0	0	0	3	0	0	0	1	33
Hartford	7	9	0	0	0	1	0	0	0	3	38
New Haven	10	0	0	0	0	2	0	0	0	3	56
MIDDLE ATLANTIC											
New York:											
Buffalo	29	35	0	0	0	13	1	0	0	0	166
New York	338	480	0	0	0	104	7	3	1	199	1,680
Rochester	10	71	0	0	0	3	0	1	0	18	89
Syracuse	13	17	0	0	0	0	0	0	0	22	37
New Jersey:											
Camden	5	1	0	0	0	1	0	0	0	0	44
Newark	47	53	0	0	0	8	0	0	0	28	123
Trenton	5	13	0	0	0	1	0	1	0	0	44
Pennsylvania:											
Philadelphia	97	155	0	0	0	37	1	0	0	35	568
Pittsburgh	31	45	0	0	0	7	0	0	0	13	270
Reading	4	0	0	0	0	1	0	0	0	0	25
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	22	39	1	0	0	0	0	0	0	5	--------
Cleveland	56	--------	0	--------	--------	--------	1	--------	--------	--------	--------
Columbus	11	12	1	0	0	4	0	2	0	1	91
Toledo	14	8	0	1	0	8	1	0	0	7	77

City reports for week ended March 14, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
EAST NORTH CENTRAL—contd.											
Indiana:											
Fort Wayne	5	7	1	0	0	0	0	0	0	1	32
Indianapolis	14	75	9	12	0	3	0	0	0	24	--------
South Bend	4	0	1	1	0	0	0	0	0	5	18
Terre Haute	3	0	0	0	0	0	0	0	0	0	22
Illinois:											
Chicago	136	229	2	0	0	38	2	0	0	54	745
Springfield	2	--------	0	--------	--------	--------	0	--------	--------	--------	--------
Michigan:											
Detroit	124	154	2	2	0	18	0	0	0	61	305
Flint	15	15	2	0	0	1	0	0	0	5	32
Grand Rapids	12	11	1	0	0	0	0	0	0	9	41
Wisconsin:											
Kenosha	3	3	1	0	0	0	0	0	0	0	--------
Madison	2	0	0	0	--------	--------	0	0	--------	3	--------
Milwaukee	31	23	0	0	0	5	0	0	0	30	127
Racine	5	3	0	0	0	0	0	0	0	8	20
Superior	3	4	0	0	0	0	0	0	0	1	6
WEST NORTH CENTRAL											
Minnesota:											
Duluth	9	0	0	0	0	2	0	0	0	0	14
Minneapolis	45	13	0	0	0	0	0	0	0	24	102
St. Paul	32	9	1	0	0	4	0	0	0	13	73
Iowa:											
Davenport	3	2	1	9	--------	--------	0	0	--------	0	--------
Des Moines	12	8	1	25	--------	--------	0	0	--------	2	43
Sioux City	1	22	1	0	--------	--------	0	0	--------	1	--------
Waterloo	2	0	1	0	--------	--------	0	0	--------	5	--------
Missouri:											
Kansas City	24	14	1	0	0	9	0	0	0	5	135
St. Joseph	3	6	0	0	0	1	0	0	0	0	19
St. Louis	34	192	2	5	0	11	1	0	1	14	258
North Dakota:											
Fargo	3	2	0	1	0	0	0	0	0	4	6
Grand Forks	0	0	0	0	0	0	0	0	0	3	--------
South Dakota:											
Aberdeen	1	0	0	0	--------	--------	0	0	--------	0	--------
Sioux Falls	2	0	0	6	--------	--------	0	0	--------	0	9
Nebraska:											
Omaha	4	9	2	32	0	2	0	0	0	2	45
Kansas:											
Topeka	8	1	0	0	0	0	0	0	0	0	13
Wichita	5	3	1	31	0	1	0	0	0	3	32
SOUTH ATLANTIC											
Delaware:											
Wilmington	5	8	0	0	0	0	0	0	0	1	32
Maryland:											
Baltimore	40	40	0	0	0	16	1	0	0	17	297
Cumberland	0	1	0	0	0	1	0	1	1	0	19
Frederick	1	0	0	0	0	0	0	0	0	0	4
Dist. of Columbia:											
Washington	28	33	1	0	0	11	0	0	0	4	154
Virginia:											
Lynchburg	0	0	0	0	0	3	0	0	0	0	23
Norfolk	1	4	0	0	0	3	0	0	0	9	--------
Richmond	4	1	0	0	0	5	0	0	1	1	64
Roanoke	0	2	0	0	0	1	0	0	0	2	16
West Virginia:											
Charleston	0	1	1	0	0	0	1	0	0	0	26
Wheeling	2	1	0	0	0	2	1	0	0	0	27
North Carolina:											
Raleigh	0	0	0	0	0	0	0	0	0	25	11
Wilmington	0	2	0	0	0	2	0	0	0	7	15
Winston-Salem	1	1	0	0	0	2	0	0	0	0	19
South Carolina:											
Charleston	1	0	0	0	0	0	0	0	0	0	27
Columbia	0	0	0	0	0	0	0	0	0	0	16
Greenville	0	1	1	0	0	0	0	0	0	0	--------

City reports for week ended March 14, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
SOUTH ATLANTIC—continued											
Georgia:											
Atlanta	5	66	2	0	0	9	1	0	2	1	110
Brunswick	0	0	0	0	0	0	0	0	0	0	5
Savannah	1	1	0	0	0	2	0	2	1	27	29
Florida:											
Miami	1	2	1	0	0	3	0	0	1	0	42
St. Petersburg	0	------	0	------	0	0	0	------	0	------	20
Tampa	0	0	0	0	0	1	1	0	0	0	30
EAST SOUTH CENTRAL											
Kentucky:											
Covington	4	6	0	0	0	1	0	0	0	0	18
Tennessee:											
Memphis	8	70	0	0	0	13	1	3	0	6	122
Nashville	3	6	0	0	0	3	0	0	0	12	51
Alabama:											
Birmingham	3	0	1	0	0	4	0	0	0	7	82
Mobile	0	0	0	0	0	2	0	0	0	2	20
Montgomery	1	0	0	0	------	0	0	0	------	4	------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0	------	------	0	0	------	0	------
Little Rock	2	2	0	0	0	3	0	0	0	0	------
Louisiana:											
New Orleans	8	18	0	11	0	9	2	2	1	0	157
Shreveport	1	0	1	0	0	2	0	0	0	0	26
Oklahoma:											
Tulsa	2	10	2	1	------	------	0	0	------	0	------
Texas:											
Dallas	6	------	5	------	------	------	0	------	------	------	------
Forth Worth	3	3	2	5	0	2	0	0	0	0	46
Galveston	0	0	0	0	0	1	0	0	0	0	17
Houston	2	3	3	7	0	2	0	2	0	0	69
San Antonio	2	1	0	0	0	6	0	0	0	0	67
MOUNTAIN											
Montana:											
Billings	1	0	0	0	0	0	0	0	0	4	1
Great Falls	3	2	0	1	0	0	0	0	0	14	12
Helena	0	0	0	0	0	0	0	0	0	0	5
Missoula	2	0	0	0	0	0	0	0	0	0	4
Idaho:											
Boise	0	1	1	0	0	0	0	0	0	0	8
Colorado:											
Denver	14	39	0	0	0	9	0	0	0	34	94
Pueblo	2	------	0	------	------	------	1	------	------	------	------
New Mexico:											
Albuquerque	0	0	0	0	0	3	0	0	0	0	6
Arizona:											
Phoenix	0	0	0	0	0	0	0	0	0	2	------
Utah:											
Salt Lake City	4	3	0	1	0	2	0	0	0	36	43
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	4
PACIFIC											
Washington:											
Seattle	10	7	2	4	------	------	1	0	------	35	------
Spokane	7	7	9	11	------	------	0	0	------	0	------
Tacoma	3	2	3	0	0	1	1	0	0	4	38
Oregon:											
Portland	5	0	15	10	0	1	1	0	0	0	71
Salem	1	0	0	0	0	------	0	0	------	0	------
California:											
Los Angeles	44	30	3	6	0	29	2	1	0	26	299
Sacramento	3	1	1	0	0	3	1	0	0	36	44
San Francisco	27	2	1	0	0	11	0	1	0	41	180

City reports for week ended March 14, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Massachusetts:									
Boston	0	1	0	0	0	0	0	2	0
MIDDLE ATLANTIC									
New York:									
New York	17	9	2	3	0	0	1	0	0
Rochester	1	0	0	0	0	0	0	0	0
Syracuse	0	0	1	0	0	0	0	0	0
New Jersey:									
Newark	2	1	0	0	0	0	0	0	0
Trenton	0	0	0	0	0	0	0	1	0
Pennsylvania:									
Philadelphia	7	6	1	1	0	0	0	0	0
Pittsburgh	1	0	1	0	0	0	1	0	0
EAST NORTH CENTRAL									
Ohio:									
Toledo	1	0	0	0	0	0	0	0	0
Indiana:									
Indianapolis	3	3	0	0	0	0	0	0	0
Illinois:									
Chicago	6	4	0	1	0	0	0	0	1
Michigan:									
Detroit	5	2	0	0	0	0	1	0	0
Flint	1	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	2	0	0	0	0	0	0	0	0
Iowa:									
Des Moines	1	0	0	0	0	0	0	0	0
Missouri:									
Kansas City	0	0	0	0	1	0	0	0	0
St. Joseph	1	0	0	0	0	0	0	0	0
St. Louis	4	2	0	0	0	0	0	0	0
Nebraska:									
Omaha	2	0	0	0	0	0	0	0	0
SOUTH ATLANTIC									
District of Columbia:									
Washington	4	0	0	0	0	0	0	0	0
Virginia:									
Lynchburg	0	0	0	0	2	0	0	0	0
Richmond	0	1	0	0	0	0	0	0	0
North Carolina:									
Winston-Salem	0	1	0	0	1	1	0	0	0
South Carolina:									
Charleston [1]	0	0	0	0	3	0	0	0	0
Columbia	2	0	0	0	0	0	0	0	0
Georgia:									
Atlanta	2	0	0	0	0	0	0	0	0
Savannah	0	0	0	0	2	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	3	3	0	1	0	0	0	0	0
Alabama:									
Birmingham	5	4	1	0	0	0	0	0	0
Mobile	1	0	0	0	0	1	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	1	0	0	0
Louisiana:									
New Orleans	1	2	0	0	2	2	0	0	0
Texas:									
Fort Worth	0	0	0	0	0	2	0	0	0

[1] Dengue; 2 cases in Charleston, S. C.

City reports for week ended March 14, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
MOUNTAIN									
Utah:									
Salt Lake	3	1	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Seattle	2	0	0	0	0	0	0	0	0
California:									
Los Angeles	0	1	0	0	0	0	1	0	0
Sacramento	0	0	1	0	0	0	0	0	0
San Francisco	2	0	1	0	0	0	0	0	1

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended March 14, 1931, compared with those for a like period ended March 15, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities February 8 to March 14, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Feb. 14, 1931	Feb. 15, 1930	Feb. 21, 1931	Feb. 22, 1930	Feb. 28, 1931	Mar. 1, 1930	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930
98 cities	67	95	68	91	70	104	73	88	[2] 66	101
New England	75	104	70	109	89	121	106	92	79	92
Middle Atlantic	53	78	64	83	56	103	61	85	67	94
East North Central	85	114	66	101	78	122	75	94	[3] 78	134
West North Central	55	107	59	95	55	120	71	118	63	110
South Atlantic	59	102	47	120	77	96	93	78	53	104
East South Central	52	66	58	96	58	54	29	36	35	24
West South Central	118	136	186	80	132	101	118	143	[4] 63	111
Mountain	78	62	35	70	87	35	61	88	[5] 29	26
Pacific	49	75	59	53	57	63	63	38	55	63

MEASLES CASE RATES

	Feb. 14, 1931	Feb. 15, 1930	Feb. 21, 1931	Feb. 22, 1930	Feb. 28, 1931	Mar. 1, 1930	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930
98 cities	521	411	668	446	703	538	769	620	[2] 913	646
New England	534	472	541	418	635	506	909	593	1,346	743
Middle Atlantic	397	213	652	254	645	346	874	417	1,026	396
East North Central	183	251	255	267	300	345	369	442	[3] 449	471
West North Central	1,314	810	1,086	775	874	939	643	938	595	781
South Atlantic	1,817	834	2,202	441	2,500	148	2,238	535	2,753	481
East South Central	896	233	1,123	604	1,042	753	1,036	717	1,146	634
West South Central	17	693	24	745	24	704	68	505	[4] 33	617
Mountain	688	758	1,567	767	1,209	1,507	1,332	2,106	[5] 333	2,449
Pacific	168	1,243	243	1,271	223	1,636	347	1,581	356	1,881

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1931, and 1930, respectively.
[2] Cleveland, Ohio; Springfield, Ill.; Dallas, Tex.; and Pueblo, Colo., not included.
[3] Cleveland, Ohio, and Springfield, Ill., not included.
[4] Dallas, Tex., not included.
[5] Pueblo, Colo., not included.

Summary of weekly reports from cities February 8 to March 14, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

SCARLET FEVER CASE RATES

	Week ended—									
	Feb. 14, 1931	Feb. 15, 1930	Feb. 21, 1931	Feb. 22, 1930	Feb. 28, 1931	Mar. 1, 1930	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930
98 cities	348	302	346	294	373	357	345	321	[2] 376	337
New England	683	382	589	409	606	402	527	431	589	426
Middle Atlantic	321	234	342	242	381	308	359	283	389	327
East North Central	375	434	353	421	364	510	346	448	[3] 395	461
West North Central	474	331	497	327	509	341	492	345	518	308
South Atlantic	320	252	304	236	363	258	354	206	310	210
East South Central	378	149	529	149	553	173	401	173	477	96
West South Central	105	108	139	94	125	108	71	139	[4] 99	167
Mountain	409	423	296	308	305	388	305	300	[5] 428	379
Pacific	123	269	94	202	145	352	121	241	96	229

SMALLPOX CASE RATES

	Feb. 14, 1931	Feb. 15, 1930	Feb. 21, 1931	Feb. 22, 1930	Feb. 28, 1931	Mar. 1, 1930	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930
98 cities	18	26	20	24	20	30	13	25	[2] 20	25
New England	0	7	0	0	0	0	0	2	0	0
Middle Atlantic	0	0	3	0	0	0	0	0	0	0
East North Central	10	33	13	20	11	40	15	24	[3] 10	30
West North Central	84	48	128	93	128	91	57	79	132	70
South Atlantic	0	6	2	2	0	2	0	2	0	4
East South Central	12	24	17	12	23	6	23	18	0	24
West South Central	132	98	51	52	64	111	47	63	[4] 74	24
Mountain	0	35	44	18	0	26	17	9	[5] 19	9
Pacific	29	89	22	101	39	87	12	105	41	115

TYPHOID FEVER CASE RATES

	Feb. 14, 1931	Feb. 15, 1930	Feb. 21, 1931	Feb. 22, 1930	Feb. 28, 1931	Mar. 1, 1930	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930
98 cities	3	6	4	5	7	8	4	8	[2] 3	6
New England	2	2	0	5	5	0	5	2	0	5
Middle Atlantic	2	6	3	6	6	4	3	4	2	5
East North Central	1	3	0	1	3	1	1	3	[3] 1	1
West North Central	2	10	4	2	11	6	11	8	0	1
South Atlantic	0	8	10	14	22	60	12	40	6	24
East South Central	29	18	0	6	6	30	17	12	17	42
West South Central	14	7	7	3	14	0	0	31	[4] 16	75
Mountain	0	0	9	9	0	0	0	0	[5] 0	13
Pacific	10	4	12	10	4	6	2	6	4	0

INFLUENZA DEATH RATES

	Feb. 14, 1931	Feb. 15, 1930	Feb. 21, 1931	Feb. 22, 1930	Feb. 28, 1931	Mar. 1, 1930	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930
91 cities	59	20	60	19	50	19	44	16	[2] 34	13
New England	46	5	43	17	24	12	19	19	36	2
Middle Atlantic	49	14	42	15	40	16	32	13	23	11
East North Central	56	17	61	16	61	16	48	12	[3] 27	9
West North Central	56	12	68	12	74	15	59	3	50	6
South Atlantic	118	32	122	22	79	28	73	36	57	18
East South Central	63	58	139	71	76	52	139	58	101	84
West South Central	159	68	97	68	45	64	52	32	[4] 55	43
Mountain	17	35	61	26	17	18	44	35	[5] 29	18
Pacific	14	17	26	2	41	10	34	2	36	2

PNEUMONIA DEATH RATES

	Feb. 14, 1931	Feb. 15, 1930	Feb. 21, 1931	Feb. 22, 1930	Feb. 28, 1931	Mar. 1, 1930	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930
91 cities	220	171	217	177	212	193	194	166	[2] 189	155
New England	291	193	276	242	236	232	185	220	147	169
Middle Atlantic	254	191	236	190	217	219	229	181	214	178
East North Central	182	128	187	151	193	179	160	141	[3] 130	127
West North Central	124	111	147	153	218	138	218	129	159	144
South Atlantic	373	214	340	222	312	236	265	222	332	196
East South Central	164	220	265	239	271	175	227	214	240	233
West South Central	176	256	228	174	221	185	148	160	[4] 211	142
Mountain	183	256	200	247	191	247	131	150	[5] 209	123
Pacific	72	107	70	67	91	62	101	75	125	65

[2] Cleveland, Ohio; Springfield, Ill.; Dallas, Tex.; and Pueblo, Colo., not included.
[3] Cleveland, Ohio, and Springfield, Ill., not included.
[4] Dallas, Tex., not included.
[5] Pueblo, Colo., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended March 14, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended March 14, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Smallpox	Typhoid fever
Prince Edward Island [1]				
Nova Scotia	1	22		
New Brunswick				1
Quebec	1			5
Ontario	2	8	2	6
Manitoba	1			
Saskatchewan			40	3
Alberta				1
British Columbia	1	3		
Total	6	33	42	16

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended March 14, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended March 14, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Mumps	24
Chicken pox	89	Scarlet fever	77
Diphtheria	35	Tuberculosis	74
Erysipelas	8	Typhoid fever	5
Measles	117	Whooping cough	29

GREAT BRITAIN

England and Wales—Vital statistics—October–December, 1930.—During the fourth quarter of the year 1930, 154,779 births and 115,698 deaths were registered in England and Wales, giving a birth rate on an annual basis of 15.4 per 1,000 population and a death rate of 11.5 per 1,000. The figures are provisional. The mortality of infants under 1 year of age was 61 per 1,000 live births.

Deaths from certain communicable diseases in 159 smaller towns for the quarter ended December 31, 1930, were as follows:

Disease	Deaths	Disease	Deaths
Diarrhea and enteritis (under 2 years)	92	Scarlet fever	15
Diphtheria	70	Typhoid fever	6
Influenza	173	Whooping cough	35
Measles	54		

During the 14 weeks ended January 3, 1931, deaths from certain communicable diseases were reported in 107 county boroughs and great towns, including Greater London, as follows:

Disease	Number of deaths	Death rate per 1,000 population	Disease	Number of deaths	Death rate per 1,000 population
Diarrhea and enteritis (under 2 years)	849		Scarlet fever	93	.02
			Smallpox	4	
Diphtheria	482	0.09	Typhoid fever	27	
Influenza	629	.12	Whooping cough	171	.03
Measles	472	.09			

England and Wales—Communicable diseases—Fourteen weeks ended January 3, 1931.—During the 14 weeks ended January 3, 1931, cases of certain communicable diseases were reported in England and Wales as follows:

Disease	Cases	Disease	Cases
Diphtheria	20,421	Puerperal pyrexia	1,540
Ophthalmia neonatorum	1,324	Scarlet fever	29,310
Pneumonia	12,708	Smallpox	1,550
Puerperal fever	633	Typhoid fever	506

Scotland—Vital statistics—Quarter ended December 31, 1930.—The Registrar General of Scotland has published the following statistics for the fourth quarter of the year 1930:

Population, estimated	4,879,700
Births	23,087
Birth rate per 1,000 population	18.8
Deaths	15,985
Death rate per 1,000 population	13.0
Marriages	8,210
Deaths under 1 year	2,070
Deaths under 1 year per 1,000 births	90
Deaths from—	
Bronchitis	977
Broncho-pneumonia	807
Cerebrospinal meningitis	37
Diabetes	171
Diphtheria	139
Dysentery	6
Erysipelas	42

Deaths from—Continued.

Heart disease	2, 580
Influenza	127
Lethargic encephalitis	28
Malaria	3
Measles	39
Nephritis (acute)	42
Nephritis (chronic)	422
Paratyphoid fever	6
Pneumonia	656
Poliomyelitis	1
Puerperal sepsis	44
Scarlet fever	29
Syphilis	28
Tetanus	5
Tuberculosis (pulmonary)	728
Tuberculosis (other forms)	244
Typhoid fever	6
Whooping cough	120

JAMAICA

Communicable diseases—Four weeks ended February 28, 1931.—During the four weeks ended February 28, 1931, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island of Jamaica outside of Kingston as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chicken pox	3	4	Puerperal septicemia		1
Diptheria		1	Scarlet fever	8	18
Dysentery		2	Tuberculosis	43	65
Erysipelas		3	Typhoid fever	13	40
Leprosy	1	1			

Influenza.—According to a report dated February 27, 1931, there was an epidemic of mild influenza on the island of Jamaica. Two hundred cases had been unofficially reported. No deaths had occurred, and the epidemic was not considered serious.

MEXICO

Vera Cruz—Deaths—February, 1931.—During the month of February, 1931, deaths from certain diseases were reported in Vera Cruz, Mexico, as follows:

Disease	Deaths	Disease	Deaths
Bronchitis	3	Pneumonia	6
Cancer	5	Rabies	1
Dysentery	2	Septicemia	3
Gastro-intestinal disorders	21	Syphilis	5
Hookworm disease	3	Tuberculosis	19
Influenza	1	Typhoid fever	3
Malaria	6	All other causes	68
Meningitis	4		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Week ended— December, 1930		January, 1931					February, 1931				March, 1931		
					20	27	3	10	17	24	31	7	14	21	28	7	14	21
China:																		
Canton	C	1	1															
Shanghai	C	38	2															
	D	4																
India	C	36,529	18,944	11,112	1,745	3,258	2,779	2,905	3,594	4,022								
	D	17,635	9,782	5,933	918	1,724	1,550	1,497	1,770	2,165								
Bombay	C	16	19	13					20	1								
	D	11	17	7					6	3								
Calcutta	C	24	33	22	9	7	6	6	36	23	24	32	27	33	45	65		
	D	15	16	16	6	4	5	5	25	19	19	23	22	25	26	39		
Karikal	C						1						4		1	4		
	D												4			4		
Madras	C	2	1		14	44	70	73	47	36	16		18	20		6		
	D	2			8	12	19	23	21	11	7	8	5	4	14			
Negapatam	D										1	2	1		2			
Rangoon	C	1				1												
	D	1				1			1									
Tuticorin	C	1	1	5	1				1					1				
	D	1	1															
India (French):																		
Chandernagor	C	3	1	1		1	1				1			1				
	D	1			1	1	1				1			1				
Pondicherry	C	1	1	4	3	9	2	17	9	4	3	3	10	20	31	39		
	D	1		4	3	3	1	14	3	3	3	2	10	9	6	9		
India (Portuguese)	C		14		1													
	D		9															
Indo-China (see also table below):																		
Pnompenh	C	2	1	2						1	2	1		3	3	3		
	D			2							2			1	2	2		
Saigon and Cholon	C	2	1	3	1		4	4	4	1		1			3	1		
	D			1			2	2	2	1					3	1		

Philippine Islands:[1]																		
Ports—																		
Iloilo	C	1		1			1				2							
	D	4		3			1				2							
Manila	C	5																
	D	1																
Provinces—																		
Antique	C	40																
	D	18																
Bulacan	C	2																
	D	1																
Capiz	C										3	56	69	54	28	35	29	11
	D										2	45	55	39	23	29	24	10
Iloilo	C	50	30	45	7	5	13	3	11	41	36	57	27	42	10	16	2	5
	D	40	23	27	6	4	10	2	9	27	25	49	21	22	11	11	2	2
Masbate	C																21	
	D																9	
Negros, Occidental	C	28	56	163	28	19	33	40	19	32	33	6	1	1	2			
	D	20	41	123	22	16	26	33	15	17	19	5	1	1	2			
Negros, Oriental	C											1						
	D											1						
Samar	C	7	16	8	2	1	12	2										
	D	7	12	8	1		7	1										
Sorsogon	C		5															
	D		4															
Surigao	C	(2)																
Siam	C	4	4	6	2		2	2	2		1			1				
	D	1	4	6	2		2	2	1									
Bangkok	C	3	3	4	2	1	1	2	2		1		1			1		
	D	2	2	4	2	1		1	1							1		

Place		August, 1930	September, 1930	October, 1930	November, 1930			December, 1930			January, 1931			February, 1931	
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20
Indo-China (French) (see also table above)															
Annam[1]	C	3													
Cambodia[3]	C	59	38	22	8	1	17	28				19	36		35
Cochin-China[3]	C	27	33	28	5	5	3	8				4	13		5

[1] Figures for cholera in the Philippine Islands are subject to correction
[2] During the period from Aug 24 to Sept 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, P I.
[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths, P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec 13, 1930	Week ended— December, 1930: 20	December, 1930: 27	January, 1931: 3	January, 1931: 10	January, 1931: 17	January, 1931: 24	January, 1931: 31	February, 1931: 7	February, 1931: 14	February, 1931: 21	February, 1931: 28	March, 1931: 7	March, 1931: 14	March, 1931: 21
Algeria																		
Algiers	C	6	11	2	1				1		1		1					
	D		3															
Bone	C										1							
Constantine, vicinity of	C		1			3	1	46			1		1					
	D										1							
Oran	C	10	2															
	D	3	1															
Plague-infected rats		6	1															
Philippeville	C	3	2					1										
	D	1						1										
Argentina:																		
Cordoba Province	C									1				2				
Entre Rios Province—Diamante	C														2			
Jujuy Province—Palpala	C										1			1				
Santa Fe	C													2				
Belgian Congo	C		1	1														
	D		1	1														
British East Africa (see also table below):																		
Tanganyika	C			3	2										15			
	D			3	2										4			
Uganda	C	165	171	111	18	17	14	18	7	8	2							
	D	164	168	112	18	17	14	18	6	8	2							
Ceylon: Colombo	C	3	1	9	4		4	1	1	1	1	5	6	2	1	2		
	D	3	1	8	4		4	1		1	1	4	7	2	1	3		
Plague-infected rats			1	2							1	1	1	1	1			
China:																		
Manchuria—Tungliau and Nungan	C	1																
Shensi	C		1															
Dutch East Indies:																		
Batavia and West Java	C	107	143	208	54	56	66	63	56	57	37							
	D	103	146	206	54	57	66	61	54	53	37							
Java and Madura	D	335	501	557	159	143	173	140	142	102	98	85						
Egypt:																		
Alexandria	C	9	7	4	1	1		1				1				1		
	D	6	7	1														
Plague-infected rats				3	1					1				1				

ssiout	C			[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
	D		1	1				1	2	2	2		4		3	4		4
swan	C			3														
eni-Suef	C								1									
eirout	C									19	2							
	D									2	2							
harbieh	C										1							
	D										1							
irga	C				3	1	3					1						14
	D					1	1					1						2
anfalut	C							23	5	21	4		11		2	2	3	5
	D							5	2	3	1		4		1			2
inieh	C			1						1	1							2
ort Said	C		2															
F ce: Marseille	C	4	4															
G e (see also table below): Pyrgos	C	2																
India	C	2,371	2,721	3,259	987	794	841	1,118	1,169	1,279								
	D	1,068	1,497	1,856	548	476	582	620	837	737								
Bassein	C		1					2	1		1	2				1		
	D							1	1			2	1					
Bombay	C	2	1							1			1					
	D	2	1							1			1					
Plague-infected rats		64	30	32	10	9	6	13	10	6	9	9	14		8	10		
Madras Presidency	C	196	185	148	30	94	96		73	99	75							
	D	110	124	78	14	71	69		47	53	39							
Rangoon	C	2	2			1	1			2								
	D	2	1			1				2								
Plague-infected rats		1	1	4	1	1			2	1	1			8				
India (Portuguese)	C		3															
	D		3															
Indo-China (see also table below):																		
Pnompenh	C	2		6	1				1	3	2	1				1		
	D	3	1	6	1				1	3	2	1		1	2	1		
Saigon and Cholon	C	1																
Iraq: Baghdad	C	1	P	4						2	3				1	2	1	3
	D	1		2						2	2					2		3
Madagascar (see also table below): Tamatave	C	1	5	4		2												
	D	1	3	3														
Morocco	C		5		9		10		13									
	D				4		4		4									
Nigeria: Lagos	C	5	38	9	2	1	1	1				1						
	D	5	5	9	2	1	1	1				1						
Plague-infected rats		11	13	5	4		1											
Peru (see table below)																		
Senegal (see table below).																		
Siam	C	1	6									4	5					
	D		5									2	1					
Bangkok	C		1	1		1	2			4	4			2	3			
	D		1	1		1	2			4	3	1		1	4			
Nagara Rajsima	C	1	1	11	4	3	4	6	3	2	1	3	7					
	D	1	1	9	3	3	1	3	2	3	1	4	6					
Syria: Beirut	C		6					1				1		1				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Week ended— December, 1930: 20	Dec. 27	January, 1931: 3	Jan. 10	Jan. 17	Jan. 24	Jan. 31	February, 1931: 7	Feb. 14	Feb. 21	Feb. 28	March, 1931: 7	Mar. 14	Mar. 21
Tripolitania	C		1	13					2	2	1	3		1			1	
	D			1					2			1						
Tunisia: Tunis	C		1	P	12			1	1					9	2	3		
	D													7				
Union of Socialist Soviet Republics:																		
Gouranduz	D										28							
Transcaucasia—Karabakh	C									6								
Union of South Africa:																		
Cape Province	C		1	P														
Orange Free State	C						2					P						
	D						2											
On vessel: S. S. Marionga de Thermiotis at Avonmouth	C					1												

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
British East Africa (see also table above):							
Kenya	C	97	87	53	58	62	50
Greece (see also table above)	C				2		
Indo-China (see also table above)	C	1	2	5	2	5	1
Madagascar (see also table above):							
Ambositra Province	C				4	44	
	D				4	44	
Antisirabe Province	C	24	11	21	3	18	
	D	24	11	21	3	18	
Miarinarivo Province	C	1	2	7	18	12	
	D	1	2	7	18	12	
Moramanga Province	C		27	18	20	19	
	D		27	17	20	19	
Tananarive Province	C	28	39	79	125	170	
	D	28	38	79	116	164	

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
Peru	C	8	21	10	42	34	8
	D	1	8	2	20	14	
Senegal:							
Baol [1]	C	62	79	48	53		
	D	48	20	23	35	4	
Dakar [1]	C	140	108	3			
	D	122	90	8			
Louga [1]	C	138	75	61	37	10	
	D	103	33	30	25	3	
Thies [1]	C	54	34	12	24	27	2
	D	30	20	4	15	23	1
Tivaouane [1]	C	119	110	20	53	31	2
	D	70	54	14	31	25	1

[1] Reports incomplete.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Sept. 21-Oct. 18, 1930	Oct. 19-Nov. 15, 1930	Nov. 16-Dec. 13, 1930	Week ended— December, 1930		January, 1931					February, 1931				March, 1931		
					20	27	3	10	17	24	31	7	14	21	28	7	14	21
Algeria:																		
Algiers	C				1							1		1				
Bone	C										1							
Constantine	C		1															
Oran	C			3														
Arabia: Aden	C											1	1					
Belgium	C												1					
Brazil:																		
Porto Alegre (alastrim)	C	26	28	36														
Rio de Janeiro	C		2															
British East Africa (see also table below) Tanganyika	C	95	17	385	23	1	57	3	21	27	18	6						
	D	6	1	36	1		3		1	1	2	1						
British South Africa: Southern Rhodesia	C	153	95	18				18	2	1								
	D			3														
Canada:																		
Alberta	C	22		1			19			7			1					
British Columbia—Vancouver	C	2	3	1			1	2				2	1	2	5			
Manitoba	C										1				1			
Winnipeg	C							1							1			
Nova Scotia	C										1							
Ontario	C	19	59	23	1		8	8	10	3	32	4	10	4	7	8		
Kingston	C					2	4		1									
North Bay	C					1		1					1					
Ottawa	C		37	12			2		1	1	1			1				
Sault Ste Marie	C							1	11	8	5	6			2			
Toronto	C			4													1	
Quebec	C			2						2								
Saskatchewan	C	3	2	18					7	6	5	20	17	18	18	10		
China:																		
Canton	C												2			1		
Chungking	C	P	P	P	2													
Foochow	C	P	P	P				P		P								
Hong Kong	C					1				1			2	5				
	D												1	1	1			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept 21–Oct. 18, 1930	Oct. 19–Nov 15, 1930	Nov. 16–Dec 13, 1930	Week ended— December, 1930: 20	December, 1930: 27	January, 1931: 3	January, 1931: 10	January, 1931: 17	January, 1931: 24	January, 1931: 31	February, 1931: 7	February, 1931: 14	February, 1931: 21	February, 1931: 28	March, 1931: 7	March, 1931: 14	March, 1931: 21
China—Continued.																		
Manchuria—																		
Harbin	C		1								1							
Kwantung—Dairen	C			4	1													
	D			1														
Nanking	C	P	P	P	P	P	P	P	P		P	P	P					
Shanghai—																		
Foreigners only	C	1	2	8	4	2	6	2	1	1	6	4	4	7	2			
Including natives	D		1	4	5	1	1	4	2	4	4	3	5	2	4	3		
Swatow	D	4	3	3		2	1	2	1	1	3	2		3	3			
Tientsin	C	1	1	2					1									
Chosen (see table below).																		
Colombia: Cali	D	2		1														
Dutch East Indies.																		
Java—Batavia and West Java	C	14	26	6	2		2			28		1						
	D	4	4	2		1	1			1		1						
Sanggi Islands	C		29															
	D		3															
France (see table below).																		
Great Britain:																		
England and Wales	C	325	372	508	138	135	164	228	187	272	286	213	221	250	247	227		
Bradford	C	1	1	1			1			1		3		1				
Cardiff	C	1																
Leeds	C	1	2				2											
London	C	29	172	184	27	38	48	48	45	47	33	24	23	16	23	36		
London and Great Towns	C	52	296	433	105	131	162	162	154	198	194	147	150	186	189	158		
	D		1	1										1				
Sheffield	C									1	1	1		16	6	10		
Stoke-on-Trent	C		1							1						1		
Greece (see table below).																		
Honduras:																		
Amapala	C															1		
Ocotopeque and Gracias districts	C															P		
Puerto Castilla	C							4	7	1		3	3					

India	C	2,322	2,412	3,627	942	1,169	1,278	2,234	2,663	2,396								
	D	572	606	871	262	281	327	510	497	486								
Bombay	C	1		1			1	1	2	2	2	1			3			
	D			1			1	1			1				1			
Calcutta	C	12	9	18	10	19	15	15	28	28	40	47	35		83			
	D	11	7	11	7	13	10	10	16	22	29	33	26		66			
Cochin	C	12	25	22	6	7		2	5	6	8	10	19		16	24		
	D	1	3	4				1					1		1	1		
Karachi	C			3							2	1			4			
	D			1							1	1						
Madras	C	19	9	20		1		3	4	7	3	2	4	1	3	1		
	D	8	2	3											1			
Moulmein	C									2								
Negapatam	C	11	9	6														
Rangoon	C	2	1	1									2		1			
	D		1															
Tuticorin	C	1																
Vizagapatam	C	1										1			8			
	D														2			
India (French):																		
Chandernagor	C	3	3			5			3	2	1	3	2		6			
	D	1	1			2	1		1						1			
Karikal	C	1					1	2	1	2		2	2					
	D	1						2		2		2	2					
Pondicherry Province	C	38	11	19	8	8	7	11	16	8	13	8	1	1	10			
	D	36	11	17	7	8	7	10	16	8	13	8	1	1	10			
India (Portuguese)	C				3			1	1									
Indo-China (see also table below):																		
Pnompenh	C	2		1		2						1						
	D			1								1						
Saigon and Cholon	C		2	2					3	1		2		2	2	6		
	D		2	2					2			2			1	5		
Iraq:																		
Baghdad	C	2													3			
Mosul Liwa	C	69	6	16				1		2		1		5				
	D	27		2										1				
Ivory Coast (see table below).																		
Japan: Kobe	C														1	1		
Mexico (see also table below):																		
Jalisco (State)—Guadalajara	D	3	3	3						1								
Juarez	D	1	1															
Mexico City and surrounding territory	C	13	9	6	1	5	4						7	5				
	D	3	2	6	2	1	3					1	1	3	2			
Vera Cruz	C		1										1		1	1		
Morocco (see table below).																		
Nicaragua: Porto Cabezas	C				2													
Panama Canal Zone	C										2							
Poland	C		8	3			23	2						1				
Portugal: Lisbon	C	16	20	37	21	17		34	27	31	15	30		12	19			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases, D, deaths; P, present]

Place		Sept. 21–Oct 18, 1930	Oct. 19–Nov 15, 1930	Nov 16–Dec 13, 1930	Week ended— December, 1930: 20	December, 1930: 27	January, 1931: 3	January, 1931: 10	January, 1931: 17	January, 1931: 24	January, 1931: 31	February, 1931: 7	February, 1931: 14	February, 1931: 21	February, 1931: 28	March, 1931: 7	March, 1931: 14	March, 1931: 21
Siam	C	1						1	1		1		1	1				
Somaliland, British: Boales	C	1	1	1														
	D	1						1										
Spain	C		51	67	19	31	18				10	8	10	4	10			
Straits Settlements	C	5	10	17	3		2	1	3	1	2	1			2			
	D	1	2	7	2		1				1				1			
Sudan (Anglo-Egyptian)	C	82	5	50		47		17	1	7		3	1	1	44	51	3	1
	D	7	1	5		5		1		7					6	4		
Sudan (French) (see table below).																		
Switzerland: Berne Canton	C	1																
Syria (see table below).																		
Tunisia: Tunis	C	2					13	4	6	1	1							
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P				P						
Orange Free State	C		2	P								P						
Transvaal	C	P	P	P	P	P	P		P	P	P	P						
Upper Volta	C			6				4						8	10			
	D							2										
On vessel:																		
S. S. Clan Mactoggart at Suez	C												2					
S. S. Muncaster Castle at Manila from Hong Kong	C					1												
S. S. Matheran at Suez from Calcutta	C									1								
S. S. Clan Buchanan at Suez	C														2			

Place		August, 1930	September, 1930	October, 1930	November, 1930			December, 1930			January, 1931			February, 1931	
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20
Indo-China (see also table above)	C	93	192	258		86		38	9	14			46		46
Ivory Coast	C			4		2		9							
Sudan (French)	C	39	P	17				43		96					
	D	3		2				16		4					
Syria: Beirut	C	1										1			

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
British East Africa (see also table above)							
Kenya	C	186		424		653	
Chosen	C	65	35	3	22		
	D	21	15	5	6		
France	C	1					
Greece	C	1	6				4
Mexico (see also table above)	D	659	718	822	893		1
Morocco	C	3	8	4	4	20	
Turkey	C	51	21	19	74		
	D	13	4	2	1		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Aug. 24-Sept. 20, 1930	Sept. 21-Oct. 18, 1930	Oct. 19-Nov. 15, 1930	Nov. 16-Dec. 13, 1930	Week ended— December, 1930: 20	27	January, 1931: 3	10	17	24	31	February, 1931: 7	14	21	28	March, 1931: 7	14
Algeria:																		
Algiers	C	3		1	2									1	1			
Constantine Department	C		2	1	2			3	3		6	6	19			4		
Oran	C	1	3		5						1	2					1	
Bulgaria	C	4	6	3	11	3				9	2	1	1		2			
	D					1												
China:																		
Canton	C										2							
Manchuria—Harbin (see also table below)	C	2	1		1						3							
Shanghai	C										2							
Tientsin	C				1													
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C	3	1	2	2													
	D	1		2														
Beheira Province	C	1				1												
	D					1												
Cairo	C	2			1	1							1					
Port Said	C	1	1	2							1							
Great Britain: Scotland	C												1					
Glasgow	C											2						
	D											1						
Guatemala.[1]																		
Iraq: Baghdad	C													2	1	1	1	1
	D													1				
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico (see also table below):																		
Durango	D	1	2									1						
Mexico City, including municipalities in Federal District	C	7	8	11	14	5	2	4	1	13	12	6	8	13	13	9		
	D	2	2	4	7	4	1	3	2	8	9	9	8	4	7	5		
San Luis Potosi	D				2									2	2		1	1
Morocco	C	2		3	1	8					5	6	2	7	8	5	8	
	D		1								2				1			

Palestine	C	3	3	3	7	1	1		2	1	1			3				2
Poland	C	23	22	37	42	18	6	28	11	19	21	16	50	49	41	43	56	
	D	1	2		7	3				2	1	4	1	3	3	4	9	
Portugal: Oporto	C		2	4	6						1							
Rumania	C	4	14	41	34	20	34		59	54	43	51	45					
	D			2	3	1	2		2	1	7	6	2					
Spain	C	1	2	4	1													
	D	1	2		1													
Tunisia	C	6	12		28						7	4	5			6	12	
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P					
Municipality of East London	C	2	1	1	1	P		2	1		1	1	1					
Natal	C	P	2	P					P	P	P	P	P	P				
Orange Free State	C	P		P		P	P		P	P	P	P	P					
Transvaal	C	P	P	P	P	P	P	P	P	P	P	P	P					
Yugoslavia (see table below).																		

Place		Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931
China: Harbin (see also table above)	C	5		3			
Chosen: Seoul	C	2	1	7	1	1	
Czechoslovakia	C	1			16	16	28
Greece: Athens	C	6	4	4	4	10	10
Latvia	C	1	2				

Place		Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931
Lithuania	C	7	24	1	5	6	26
	D	1	2		1	3	3
Mexico (see also table above)	D	26	47	47			
Turkey	C	11		28	3	2	
Yugoslavia	C	2		2	2		20
	D	1		1			2

YELLOW FEVER

	Cases	Deaths
Brazil[1]		
Bahia State—Mar. 14, 1931	1	
Ceara State—Mar. 14, 1931	2	
Barbalha, Feb. 7, 1931	1	1
Minas Geraes State, Mar. 20, 1931	2	
Rio de Janeiro State—		
Mar. 7, 1931	1	1
Mar. 21, 1931	1	1

	Cases	Deaths
Brazil—Continued		
Rio de Janeiro State—Continued.		
Cambucy—		
Jan. 1-25, 1931	3	3
Feb. 1-7, 1931	1	1
Friburgo (imported), Jan. 25-30, 1931	1	
Padua—		
Jan. 18-24, 1931	1	1
Feb. 1-7, 1931	1	1
Gold Coast		
July 10, 1930	1	
Albosso, Aug. 4, 1930		1

[1] The Director General of Public Health of Guatemala on February 17, 1931, reported an unusual outbreak of typhus fever in a small village in Guatemala.

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The Psittacosis Outbreak in Maryland, Winter of 1929–30
Influence on Epilepsy of Diet Low in Pellagra-Preventive

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DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg Gen. R. C WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

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PUBLIC HEALTH REPORTS

VOL. 46 APRIL 10, 1931 NO. 15

THE PSITTACOSIS OUTBREAK IN MARYLAND, DECEMBER, 1929, AND JANUARY, 1930

By V. L. ELLICOTT, M. D., Dr. P. H., *Epidemiologist, Baltimore City Health Department*, and CHARLES H. HALLIDAY, M. D., *Epidemiologist, Maryland State Department of Health*

THE OUTBREAK

On January 6, 1930, Dr. Willis P. Martin, of Annapolis, observed three cases of illness in an Annapolis family in which a parrot had died. He suggested psittacosis, the disease having come to his attention through a newspaper article which appeared at the time. The parrot had been purchased from a pet shop in Baltimore on December 14, 1929.

An investigation was immediately begun in order to ascertain whether other cases of illness existed in families purchasing parrots from Baltimore pet shops. Through pet shop records, 38 homes were located and visited. Inasmuch as Baltimore pet shops sold parrots not only to residents of Baltimore but to others outside the city, the investigation was conducted jointly by the city health department and the State health department. Dr. D. S. Hatfield conducted the investigation in Baltimore City until the onset of his own illness on January 19. On account of the marked prevalence of illness associated with parrots as revealed by these investigations, on January 10 all pet shops were ordered to stop the sale of and to isolate all parrots. These restrictions remained in effect until February 21.

Number and occurrence of cases.—Altogether 36 cases were discovered, 24 in Baltimore City and 12 in the counties of Maryland outside of Baltimore. All cases had a history of exposure to recently purchased parrots.[1] These cases include not only those definitely diagnosed by attending physicians, but also those considered by the investigators as probably psittacosis as judged from symptoms and exposure. All were among white persons with ages varying from 4 to 77 years.

---

[1] The 36 cases do not include the following suspected cases.

(a) A four-month old child who was slightly ill following the purchase of a parrot from Pet Shop A. The parrot later died.

(b) A health officer of the city health department (see section health department employees).

(c) An employee of Pet Shop A, said to have an influenza-like illness Jan. 1 to Jan. 5. He left the city before investigation was made.

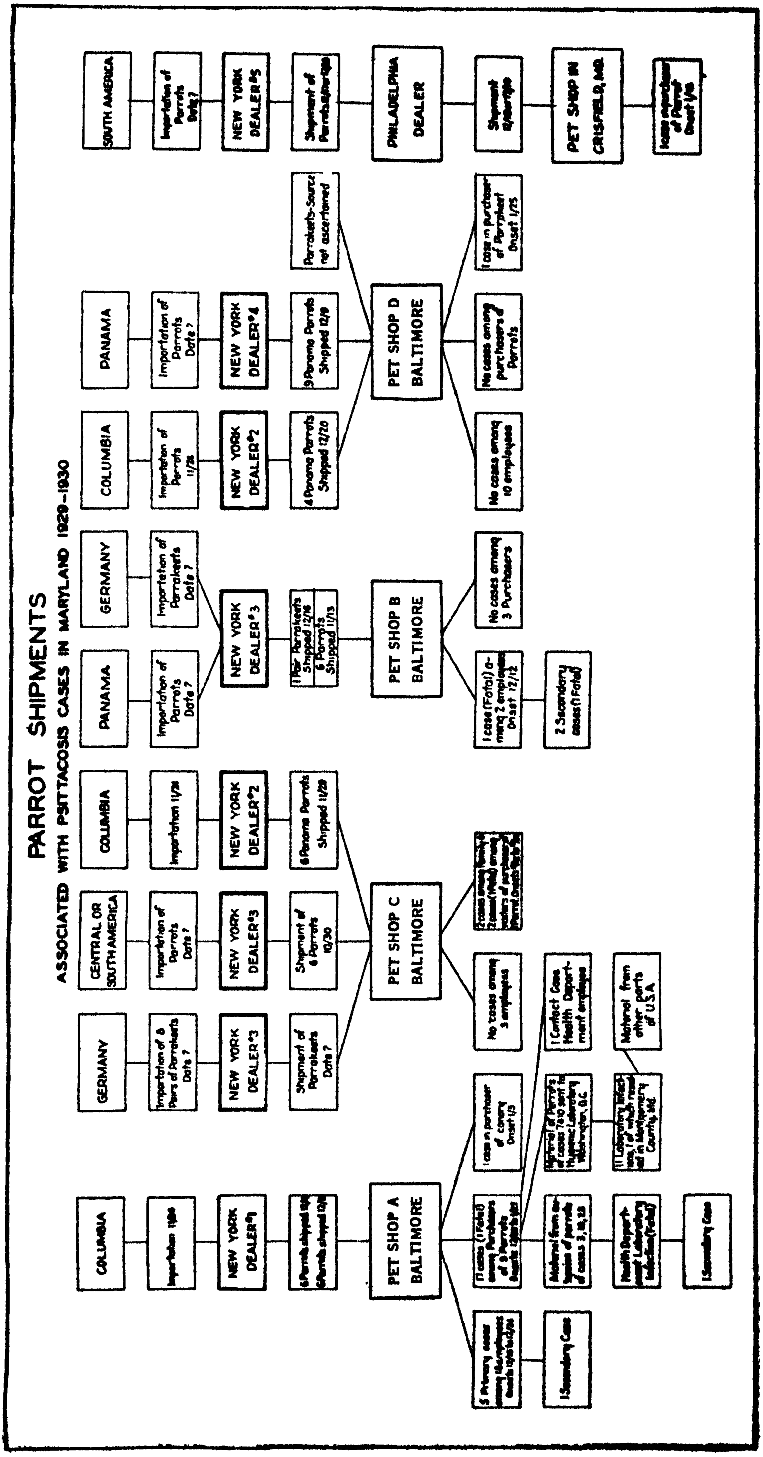

FIGURE 1.—Relation of cases to parrot shipments

TABLE 1.—*Age and sex distribution*

Age group	Males	Females	Total
Under 20 years	3	2	5
20 to 39 years	6	10	16
40 to 59 years	4	9	13
60 years and over	1	1	2
Total	14	22	36

Fatality.—Five of the 36 cases were fatal.

Source of infected birds.—Seven pet shops in Baltimore were found to be engaged in the sale of pet birds. Four of these shops were found to be concerned directly or indirectly in the causation of cases. In

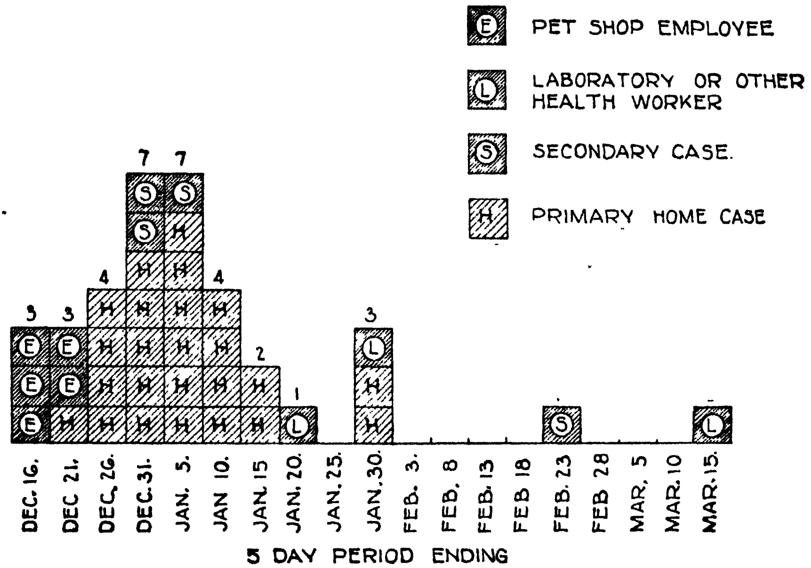

FIGURE 2.—Distribution of cases by type of exposure and date of onset

addition a pet shop in Crisfield, Md., which received parrots from a Philadelphia dealer was concerned in the causation of a case in Crisfield, Md. The 36 cases were traced to various shipments of birds, as shown on the accompanying chart.

ATTACK RATES

Pet shop employees.—Five cases of psittacosis developed among 33 employees of the four pet shops known to have had infected birds. Four of these were among 18 employees in Pet Shop A, which shop was shown to have sold at least 11 infectious birds (10 parrots and 1 canary) to 11 households.

In addition to the pet shops known to have handled infectious birds, 3 others, employing altogether about 9 persons, handled pet birds but had no cases among employees or purchasers.

Homes.—Twenty-two cases developed among a total of 49 members of the 13 households which received infectious parrots, as judged by the occurrence of human cases. The distribution of these 22 cases according to households is shown as follows:

TABLE 2.—*Distribution of cases by households*

Number of cases per household	Total number of cases	House-holds
1	8	8
2	4	2
3	6	2
4	4	1
Total "home" cases	22	13

In one family in which two cases occurred, two additional cases occurred among visitors known to have been exposed to the same bird.

In order to study the influence of the type of exposure, the members of the households were divided into two groups, viz, a "heavy exposure" group, as judged by the fact that the persons frequently handled the birds or cleaned the cages, and an "occasional exposure" group in which the members probably only occasionally touched the birds. Table 3 includes also the exposures in four families which purchased parrots but in which families no human illness occurred, though the parrots bought either died or showed some signs of illness. It does not include the family in which the suspected 4-month old case occurred.

TABLE 3.—*Attack rate in persons exposed to birds*

Exposure	Number of persons exposed	Number attacked	Attack Rate
			Per cent
Heavy exposure	31	20	65
Occasional exposure	36	2	6
All exposures	67	22	33

In regard to the "heavy exposure" group, it is of interest to note that the attack rate in the city homes was 48 per cent (10 cases out of 21 exposures) and that the attack rate in the county homes was 100 per cent (10 cases out of 10 exposures).

Secondary attack rate.—Ten patients spent their period of illness wholly or in part separate from infected parrots, so that these cases

may be taken as sources of infection for computing the secondary attack rate (infection from person to person). Twenty-one persons (not exposed to birds nor to infectious material) were exposed to these 10 cases. Sixteen of them took precautions against infection, and of these 16, one was attacked. This case was in one of the nurses who attended Doctor Stokes, a fatal case with cough and sputum. Of the five exposed persons who did not take precautions, three were attacked, two of which were in one family and were in contact with a fatal case with cough and sputum. The third case was in the wife of a pet shop employee who had psittacosis, a very light attack without cough. Of the four cases listed as secondary, two should be considered as probably secondary cases and two as definitely secondary cases. Of the two probable cases, one, the wife of a pet shop employee might have been infected by a possible visit to the pet shop; the other, a man of 77 years of age, one of the two contacts of the fatal case referred to above, was taken sick with a fatal pneumonia eight days after the primary case. It is barely possible that he died of other than psittacosis infection. The two definitely secondary cases have already been described by Dr. Charles Armstrong.[2]

TABLE 4.—*Attack rate in persons exposed to human cases*

	Number of persons exposed	Number attacked	Attack rate
			Per cent
Precautions taken	16	1	6
Precautions not taken	5	3	60
All exposures	21	4	19

In the families in which the patient was treated in the same house with the infected bird, it is, of course, not possible to estimate the secondary attack rate, because no distinction can be made between infection from the bird and infection from the human cases. It is interesting to note, however, that there were five such families in which the patient had a cough and sputum and in which the chief attendant did not contract the disease. Moreover, in four of these families, the chief attendant did not take precautions.

Health department employees.—Two cases occurred among health department employees, these being Dr. W. R. Stokes, director of the bacteriological laboratory, who died with the disease on February 10, and Dr. Daniel S. Hatfield, director of the Bureau of Communicable Diseases, who recovered. Doctor Stokes was presumably infected during autopsies of parrots. He performed three parrot autopsies, using rubber gloves and first soaking the birds in disinfectant. After being taken sick, he remarked that he did not know

[2] Public Health Reports, Aug. 29, 1930, p. 2019, second and third paragraphs.

how he could have been infected unless it was the result of not wearing a mask. Doctor Hatfield thinks that he was infected from the cough of a patient, Case No. 7, while making a physical examination. He was also exposed to places which had recently harbored infected birds, and also possibly to the birds themselves.

One of the district health officers of the city health department died of pneumonia on March 27. The postmortem report suggested psittacosis. He was, however, probably not exposed to the disease after January. His illness was not included in the list of 36 cases.

INTERVAL BETWEEN EXPOSURE AND ONSET

Fairly definite periods.—In Case No. 1, a "home" case, it appeared that the time interval between first exposure and date of onset was 12 days. This exposure occurred during a visit to the home of cases 16 and 17, when the patient was said to have "fooled with" the sick parrot (which died four days later). This patient had several other possible exposures, as follows: Through visits to pet shops about 18 days before onset; from a recently purchased, apparently well, parrot of her own; and probably from other exposures to the above mentioned sick parrot.

In case No. 16, the laboratory infection of Doctor Stokes, infection probably occurred during one of three parrot autopsies performed 9, 11, and 15 days, respectively, before the onset of his illness. Doctor Stokes was probably also exposed to infectious material in his laboratory. All three parrots had been associated with human cases and had later taken sick and died.

Case No. 12 became ill 9 days after the purchase of a canary, which died two days later. This patient was also possibly exposed to infection by visiting pet shops; also to another canary in the home which was sick two and three days before the patient's onset of illness, and to the cage of the dead canary.

Short periods.—Case No. 3, a "home" case, became ill 5 days after the parrot had been brought home. The patient had not visited any pet shops, the parrot having been brought home by the patient's brother.

Case No. 20, a pet shop employee, began working in the pet shop only six days before the onset of his illness. He denied any earlier exposure.

Long period.—Case No. 22, a "home" case, became ill 33 days following the death of a parrakeet purchased but two days prior to its death. Other sources of infection were, however, possible in this case, namely, from material in the parrakeet's cage, from other apparently well parrakeets in the house, or from later visits to the pet shop which sold the infected bird.

Interval from purchase to onset.—The interval between the purchase of the parrot and the onset of human cases in the various homes is summarized as follows:

TABLE 5.—*Interval between purchase of bird and onset of disease*

Interval between purchase of parrot and onset of human cases	Number of human cases
Under 5 days	0
5 to 9 days	4
10 to 14 days	8
15 to 19 days	5
20 or more days	6
Total	23

MODE OF INFECTION

In the primary cases the most frequent exposure appeared to be connected with cleaning the cages, fondling the parrots, hand-to-mouth feeding, and, in at least three cases, direct mouth-to-mouth feeding.

A history of a parrot bite was not elicited in any case, but one, case No. 22, was pecked by a parrakeet. The skin was not broken.

THE DISEASE IN PARROTS

Symptoms.—As described by members of the family, the following symptoms were noted in infected parrots: Diarrhea was observed in about one-half of the sick parrots. Bad odor was noticed in several instances. Other symptoms were ruffled feathers, droopiness, and sneezing. Among the 11 parrots associated with cases in the homes, 2 recovered after very slight illness, 6 died, 2 were killed while sick, and 1 was killed while apparently well. The canary associated with case No. 12 and the parrakeet associated with case No. 22 both died. In 9 families the question was asked as to whether the parrot exhibited any signs of vermin. In all instances, this question was answered in the negative.

Second cases among birds.—In some of the families visited there was more than one pet bird in the house. The fatality rate among these birds presumably exposed in the house was found to be as follows:

TABLE 6.—*Houses with more than one pet bird*

	New birds bought at time of outbreak		Old birds in household before outbreak		All exposed birds	
	Total	Number died	Total	Number died	Total	Number died [1]
Parrot	2	2	0	0	2	2
Parrakeet	2	0	0	0	2	0
Canary	2	2	6	2	8	4
All birds	6	4	6	2	12	6

[1] All sick birds died.

In considering the secondary cases among new birds, it must be borne in mind that infection may have taken place in pet shop before purchase.

No instance was found in which it can be definitely stated that a bird contracted the disease from a human case. There was, however, one instance in which this seemed to be the most likely mode of infection.

Interval between notice of symptoms in bird and human illness.—The interval between recognition of illness in birds and onset in exposed persons was as follows:

Number of birds showing symptoms prior to onset of human illness

Parrot cases	8
Canary case	1
Parrakeet case	1

Number of birds showing symptoms subsequent to onset of human illness

Parrot cases	3

Two of the parrots whose illness was followed by human cases were only slightly ill and later apparently entirely recovered. In one of these the parrot had a bad odor for one or two days shortly after purchase and sneezed occasionally, and in the other case the only abnormality noted was a drop of water in one nostril seen on the day on which the parrot was purchased.

Of the 3 parrots listed as having become ill following the onset of human cases, 2 showed no signs of illness until 7 and 9 days, respectively, after onsets of the first human cases and died after illnesses of 7 and 6 days, respectively. The third parrot was killed between the second and sixth day following the onset of the human case. It showed no illness at the time.

Interval between purchase and onset of illness.—The interval from purchase to onset of illness in twelve birds was as follows:

Onset 1 to 4 days after purchase (5 were ill on day purchased)	8
Onset 5 to 9 days after purchase	1
Onset 10 to 14 days after purchase	[1] 1
Onset 15 to 19 days after purchase	1
Onset 20 to 24 days after purchase	2
Total	13

PREVENTION AND CONTROL

Psittacosis is a disease associated with recently imported parrots and other pet birds; and the fact that this outbreak rapidly subsided after stopping importation, isolating the parrots in pet shops, and stopping sales indicates that its control is a matter of preventing contact with infectious birds by measures of this kind.

[1] Parrot, supposedly well, killed between twelfth to sixteenth day following purchase.

INFLUENCE ON EPILEPSY OF A DIET LOW IN THE PELLAGRA-PREVENTIVE FACTOR

By N. P. Walker, *Clinical Director, Milledgeville State Hospital, Milledgeville, Ga.,* and G. A. Wheeler, *Surgeon, United States Public Health Service*

In 1927 one of us (N. P. W.) had occasion to observe a number of white female epileptics under treatment with a high-fat or ketogenic diet. The diet used consisted of toast, butter, bacon, egg yolk, cream, chocolate, lettuce, mayonnaise, and small allowances of roast beef and tomatoes, the approximate chemical composition being protein 51.1 grams, fat 412.1 grams, carbohydrate 52.6 grams.

One of three patients who continued on the above diet for any considerable period developed symptoms of pellagra during the third month. There was a pronounced stomatitis but little or no skin manifestations or diarrhea. The condition cleared up promptly and completely with a change in diet and the administration of yeast. But along with the appearance of pellagra there was a rapid and marked decrease in the number of convulsions. Within a short time she was entirely free from convulsive seizures of any sort and remained so for a period of two months and four days. This patient was not considered an idiopathic epileptic, because of the presence of well-marked neurology. The neurological symptoms were also greatly improved. Following this period of intermission, during which convalescence from pellagra had been completed, the convulsive seizures reappeared but on a somewhat reduced scale as compared with her previous record. This rate has since been maintained (now more than two years) without pronounced variation.

In explanation of this striking remission in the midst of a long and fairly uniform record of convulsions, it, at first, appeared that it may possibly have been due to the effects of the ketogenic diet or, since this patient was not believed to be an idiopathic epileptic, purely a coincidence. That the ketogenic diet, *per se*, was responsible for this result receives little support from the record of the other members of the group on this diet in whom no remission of any considerable consequence was observed, though they did not continue on it quite so long. The fact that in nearly four years' continuous observation of this particular patient she has shown no pronounced remission, other than the one associated with the attack of pellagra, renders the possibility of a mere coincidence somewhat less likely.

In view of the above, it occurred to us that this favorable result may have been influenced in some way, either by the shortage of the pellagra-preventive factor in the ketogenic diet, or by some other factor associated with a diet low in this accessory, or possibly by the effects of the pellagra itself.

Since pellagra can be readily produced by simply restricting the antipellagric vitamin in the diet for a few months and, when once established, can be readily cured, at least in the early stage, by the administration of yeast or by a change in diet, it was decided to check this result by placing a suitable number of epileptics on a diet low in this factor but otherwise well balanced.

Considering the extremely poor prognosis offered by institutional epileptics and the possibility that it might eventually lead to something that would help to alleviate their wretched condition, this step seemed to us to be warranted. Accordingly, a group of 10 white females, all of whom had been diagnosed and classified as idiopathic epileptics, were selected for study and segregated in a section of one of the general wards where they were under the direct observation of a nurse both day and night.

All were more or less in a state of mental deterioration, the majority markedly so. The ages varied from 22 to 56, with an average of 36 years; institution residence from 3 to 17 years, with an average of 8 years; duration of epilepsy from 14 to 46 years, with an average of 27 years. Aside from the epilepsy involvement and its attendant traumatism, all appeared to be in fair to good physical health.

No evidence of pellagra had been observed in any of this group during their residence in the institution and no mention was made of it in their commitment histories.

The diet used is a replica of the basic diet used by Goldberger and Wheeler in the study of the pellagra-preventive value of various foodstuffs and is believed to be complete in all known respects, except for a deficiency in the pellagra-preventive factor. It is not totally deficient in this essential, since the cowpeas, tomato juice, and yeast bread supply it in small but appreciable quantity. Somewhat further restriction is therefore practicable without serious impairment of the supply of the other known factors, but this was not considered necessary nor, under the circumstances, advisable.

The following is the daily menu used:

Breakfast	Amount per patient, ounces
Mixture:	
Corn meal	2.5
California blackeyed peas	.5
Lard	.25
Salt (seasoning) (*q. s.*).	
Brown gravy:	
Flour	.25
Lard	.25
Salt and pepper (*q. s.*).	
Cane sirup	2.0
Loaf bread	1.5
Coffee without sugar or cream.	

Dinner

	Amount per patient, ounces
Mixture:	
Corn meal	2.5
California blackeyed peas	.5
Lard	.25
Salt (seasoning) (*q. s.*).	
Brown gravy:	
Flour	.25
Lard	.25
Salt and pepper (*q. s.*).	
Cane sirup	2.0
Corn meal (corn meal as corn bread)	2.0

Supper

Mixture:	
Corn meal	2.5
California blackeyed peas	.5
Lard	.25
Salt (seasoning) (*q. s.*).	
Brown gravy:	
Flour	.25
Lard	.25
Salt and pepper (*q. s.*).	
Cane sirup	2.0
Loaf bread	1.5
Coffee without sugar or cream.	

The cereal-legume mixture was cooked for one and one-half hours, the cowpeas first being ground to a coarse meal. The corn bread was taken from the regular institution supply, buttermilk, lard, and soda being used in its preparation. Coffee was served with the morning and evening meals in accordance with the established custom of the institution. Drinking water was available at all times.

In addition to the items listed above, each patient received a daily supplement consisting of ½ ounce of cod-liver oil; 4½ ounces of canned tomato juice; 90 drops of dilute hydrochloric acid; 3 grams of calcium carbonate; and 2 drops of sirup iodid of iron. With the exception of the iodid of iron, which was given at supper only, these supplements were given one-third with each meal. The cod-liver oil, hydrochloric acid, and iodid of iron were given in the tomato juice, and the calcium carbonate was mixed with the basic cereal-legume mixture.

The approximate chemical composition of the above diet is as follows: Protein, 48.6 grams; fat, 63.8 grams; carbohydrate, 407.8 grams; total calories, 2,412.

The special diet was preceded by a period of preliminary observation on the regular institution diet, varying from 17 days for some to a year or more for others. During this period it was the custom to regulate the bowels by the use of castor oil or Epsom salts, usually the latter; and in cases where the convulsions were severe or appeared in rapid succession, a mixture containing chloral hydrate, sodium bromide, and tincture belladonna was prescribed by the ward physi-

cian and used as indicated. The number of convulsions recorded during the period of preliminary observation may, therefore, be smaller than would have been the case had the laxatives and the sedative mixture not been used. Since no drugs of any sort, not even laxatives, were employed after the special diet had been begun, the contrast between the frequency of convulsions on the two diets is, in all probability, greater than the actual figures indicate. Aside from this the findings for the two periods are believed to be comparable in all respects.

The salient features of the record of each patient are given below.

Case 1.—Age, 37; hospital residence, 3 years; duration of epilepsy, 14 years; average monthly number of convulsions for 12 months preceding the special diet, 17; lowest, 8, highest, 25. Special diet begun December 17, 1929. The month of December showed 20 convulsions, January 18; February 17. Positive evidence of pellagra was noted on February 26. Though the mouth and skin changes were relatively mild, there were many subjective complaints and the pulse was fast. For safety's sake, two days later she was given a suitable diet with yeast. Within four weeks all evidence of pellagra had disappeared. There were 6 convulsions in March and 11 in April. She was again placed on the special diet on May 1. During May and June the convulsions numbered 17 and 17, respectively. Symptoms of pellagra reappeared July 26, 1930. During that month there were 12 convulsions and in August there were 11. The number rose to 21 in September.

Case 2.—Age, 34; hospital residence, 3 years; duration of epilepsy, 22 years. Average number of convulsions per month for 12 months preceding change in diet, 23. Highest, 33; lowest, 13. Placed on the special diet December 17, 1929. Beginning with December the number of convulsions following change of diet was December, 27; January, 33; February, 32; March, 14; April, 25. Stomatitis was first noted April 12 and dermatitis June 30. During May, June, and July the number of convulsions was 17, 21, and 9, respectively. Yeast treatment was begun July 31, and within about three weeks all evidence of pellagra had disappeared. The number of convulsions was 23 in August and 20 in September.

Case 3.—Age, 44; hospital residence, 12 years; duration of epilepsy, 33 years. Marked mental deterioration. Placed on special diet December 17, 1929, with preliminary observation from December 1 only. The monthly convulsions following change of diet, beginning with the month of December, were as follows: December, 42; January, 35; February, 36; March, 30; April, 26; May, 30. Dermatitis was present May 31. Yeast was begun July 2 and, since this patient had become quite feeble, a daily allowance of 40 ounces of sweet milk was added to the diet beginning July 5, following which all evidence of pellagra disappeared and patient soon regained her strength. During June there were 23 convulsions; July, 2; August, 22; September, 26.

Case 4.—Age, 35; hospital residence, 9 years; duration of epilepsy, 30 years. Mental deterioration pronounced. Average number of convulsions per month for 12 months preceding dietary change, 21; highest 25, lowest 17. Placed on special diet December 17, 1929. There were 23 convulsions in December, 26 in January, 17 in February, 17 in March, and 13 in April. Stomatitis was first noted May 17, and dermatitis May 24. Yeast treatment was begun July 16, and all evidence of pellagra had disappeared by the last of August. There were 17 convulsions in May, 19 in June, 17 in July, 17 in August, and 21 in September.

Case 5.—Age, 22; hospital residence, 10 years; duration of epilepsy, 20 years. Placed on special diet December 17, 1929. Beginning with December the monthly number of convulsions was as follows: December, 27; January, 15; February, 11; March, 12; April, 15. Stomatitis was first noted April 5, dermatitis May 31. Both the mouth and skin symptoms were very mild throughout. Yeast treatment was begun July 31, and the mouth and skin were clear within three weeks. During May there were 10 convulsions; June, 9; July, 7; August, 9; September, 14.

Case 6.—Age, 29; hospital residence, 11 years; duration of epilepsy, 29 years. Marked mental deterioration. Preliminary observation begun November 1, 1929, during which month 11 convulsions were recorded. Placed on special diet December 17, 1929. During December there were 8 convulsions; January, 9; February, 11; March, 13. Dermatitis was present on April 19. Yeast was begun June 5, and convalescence was apparently complete by July 15. The number of convulsions for April, May, June, July, August, and September were 15, 14, 8, 15, 24, and 10, respectively. This patient showed a 4 plus Wassermann in 1918. No further mention was made of this until 1923 when it was noted that the blood was negative after treatment.

Case 7.—Age, 31; hospital residence, 17 years; duration of epilepsy, 29 years. Marked mental deterioration. With preliminary observation beginning December 1 subject was placed on special diet December 17, 1929. For December, January, and February, the convulsions were 11, 12, and 13, respectively. Stomatitis was first noted March 29 and dermatitis May 31. Yeast was begun June 27, and, as the symptoms had become quite advanced, she was returned to general diet with yeast and milk on June 28. During March the number of convulsions dropped to 6, but rose to 20 in April and to 35 in May, and dropped to 11 in June. During July, August, and September there were 14, 13, and 10 convulsions, respectively.

Case 8.—Age, 24; hospital residence, 6 months; duration of epilepsy, 10 years. Marked mental deterioration. Preliminary observation began December 1, 1929, and patient was placed on special diet December 17, 1929. The number of convulsions was as follows: December, 35; January, 35; February, 37; March, 24; April, 8.

Stomatitis was first noted April 4, 1930. This patient later developed an abscess of a salivary gland and was removed to the infirmary for surgical treatment. Observation as to the number of convulsions was terminated with her removal from the group.

Case 9.—Age, 56; hospital residence, 3 years; duration of epilepsy, 46 years. This is the oldest member of the group, in whom the duration of epilepsy is longest and the number of convulsions the highest. Although there is some mental deterioration, it is less marked than in any other member. Most of the convulsions are relatively light in type. For the twelve months preceding December, 1929, the average number per month was 160. Highest 180, lowest 142. During this period she received the sedative mixture previously referred to fairly regularly at night, as most of her convulsions occurred during the night. She was placed on the special diet December 17, 1929, and during that month 180 convulsions were recorded. In January there were 130; February, 150; March, 107. On April 5 stomatitis was noted, and on April 19 dermatitis was present. Yeast treatment was started May 27, and convalescence from pellagra was apparently complete by July 10. There were 73 convulsions in April, 76 in May, 78 in June, 106 in July, 145 in August, and 272 in September.

Case 10.—Age, 37; hospital residence, 18 years; duration of epilepsy, 27 years. Extremely deteriorated mentally, but in fairly good condition physically. Placed on special diet December 17, 1929. Beginning with the month of December the record of convulsions is as follows: December, 15; January, 11; February, 13; March, 10; April, 10; May, 5. Dermatitis was first noted on May 3. The pellagrous symptoms were at first rather slow in their evolution, but later assumed a fulminating character, becoming so severe as to require patient's removal from the group for special infirmary care. Observation as to the number of convulsions was terminated with her removal from the group.

The clinical manifestations of pellagra were typical in all respects. In seven, stomatitis preceded the appearance of the skin manifestations; and in one, stomatitis was the only pellagrous manifestation observed. Usually the first evidence of beginning stomatitis was an increased redness of the vermilion border of the lower lip, which was followed shortly afterwards by a similar change involving the tongue, floor of the mouth, and, in some, the mucosa of the cheeks. In several instances the stomatitis was repeatedly observed to disappear after a variable period, to recur after a short interval. In some, the mouth became very sore and foul; and in two, superficial necrosis was in evidence when treatment was begun.

Bilaterally symmetrical skin lesions were present in 9 of the 10 patients. The initial eruption first appeared as a mild erythema

which gradually increased in intensity, accompanied by some degree of thickening. After a variable period (usually a week or 10 days) the areas involved showed more or less drying and pigmentation, which were followed by desquamation. The backs of the hands were the most frequent site of the initial lesion, though the wrists, forearms, and, less frequently, the upper arms were, in most cases, involved, either initially or by extension. Three showed lesions about the neck, two on the face, and one about the external genitalia. In four cases, where treatment was withheld for several weeks, successive waves of dermatitis were observed.

In some cases looseness of the bowels (two to four stools daily) appeared at intervals; others showed a tendency toward constipation; and some looseness of the bowels alternating with constipation. There was severe and prolonged diarrhea in one case.

As a rule, the weight was fairly well maintained. Some showed a loss of appetite, with reduced food intake, at about the time, or shortly before, the appearance of pellagra and presented a gradual decline in weight during the period of active involvement.

There was no fixed time for beginning treatment. It was our desire to withhold treatment as long as it seemed safe in order that any influence on the convulsions could be exerted. In general, the nature and trend of the symptoms and the behavior of the appetite determined the course pursued in each case. In some, a period of several weeks were allowed to elapse, while in others treatment was begun soon after the condition had become established.

The observations regarding the number of convulsions and their relationship to the appearance of pellagra are summarized in the accompanying table:

Monthly record of convulsions and their relation to pellagra in 10 white female epileptics on a pellagra-producing diet

Case No.	Record for preceding 12 months	Date special diet was begun	Convulsion record while on special diet									
			Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept.
1	Highest, 25; lowest, 8; average, 17.	Dec. 17, 1929	20	18	[1] [2] 17	[3] 6	11	17	17	[2] 12	11	21
2	Highest, 33; lowest, 13; average, 23.	do	27	33	32	14	[1] 25	17	[2] 21	[3] 9	23	20
3	Observed from Dec. 1, 1929, only.	do	42	35	36	30	26	[2] 30	23	[3] 2	22	26
4	Highest, 25; lowest, 17; average, 21.	do	23	26	17	17	13	[1] [2] 17	19	[3] 17	17	21
5	Observed from Dec. 1, 1929, only.	do	27	15	11	12	[1] 15	[2] 10	9	[3] 7	9	14
6	Observed from Nov 1, 1929; 11 convulsions during November.	do	8	9	11	13	[2] 15	[3] 14	8	15	24	10
7	Observed from Dec. 1, 1929, only.	do	11	12	13	[1] 6	20	[2] 35	[3] 11	14	13	10
8	do	do	35	35	37	24	[1] 8	([4])	([4])	([4])	([4])	([4])
9	Highest, 180; lowest, 142; average, 160.	do	180	130	150	107	[1] [2] 73	[3] 76	78	106	145	272
10	Observed from Dec. 1, 1929, only.	do	15	11	13	10	10	[2] 5	([4])	([4])	([4])	([4])
	Total		388	324	337	239	216	221	186	182	264	394

[1] Stomatitis first observed.
[2] Dermatitis first observed.
[3] Yeast or yeast combined with change of diet begun.
[4] Removed from group for infirmary treatment. Record of convulsions discontinued.

In interpreting these results it should be borne in mind that these patients had suffered from epilepsy for many years and, in the majority of them mental deterioration had progressed to a marked degree. The test may, therefore, be regarded as a very rigid one.

It will be observed that all but two (cases 4 and 6), showed a temporary reduction of around 50 per cent or more in the number of convulsions at about the time pellagra appeared or during its progress. Case 1 was permitted a second attack, developing late in July following her return to the special diet May 1. This repeated attack was accompanied by a reduction in the number of convulsions by about 30 per cent as compared with the intervening months.

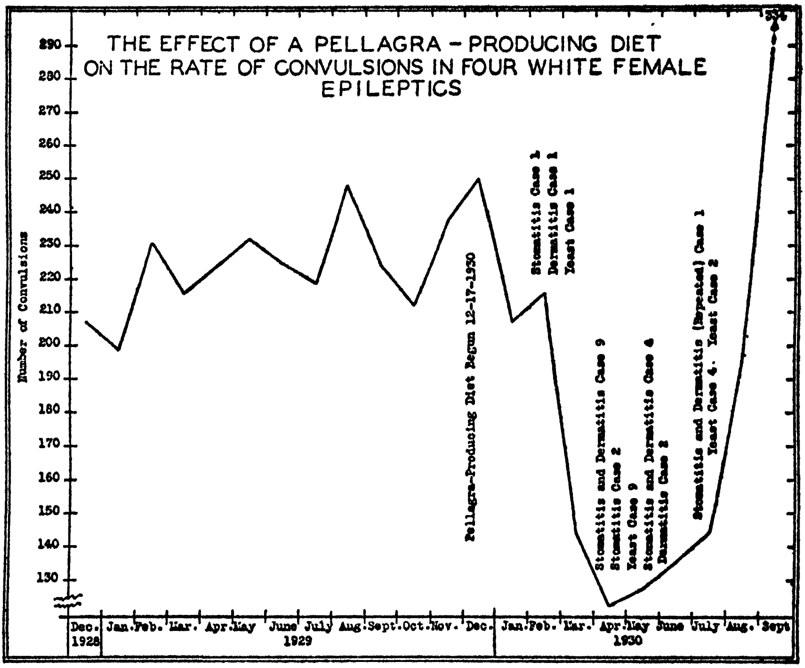

FIGURE 1—Rate of convulsions in four patients who had been under special observation for 12 months prior to beginning of pellagra-producing diet

Of this group of 10 patients, 4 (cases 1, 2, 4, and 9) had been under special observation for 12 months prior to the beginning of the diet and, therefore, afford a more extended basis for comparison. Their record is graphically illustrated by the accompanying chart.

A second group consisting of eight white female epileptics was placed on this diet on June 23, 1930. Seven of these had developed pellagra by November 30, on which date the special diet was discontinued. They showed the same favorable trend in the frequency of convulsions as was observed in the earlier group.

It will be noted from the table and chart that there is a tendency for the number of convulsions to rise soon after treatment for pellagra

is begun. In some instances the previous record is equaled, and in one (case 9) it is far surpassed. The sharp upward swing above the previous level during the month of September, as shown by the chart, is due largely to the behavior of this patient. She was continued under observation, without change of diet, during the month of October, during which period 130 convulsions were recorded, as against 272 for September. The possibility that this marked transient increase over her previous level was purely accidental must be considered, though continuous observation for more than two years had shown no striking departure from month to month. Assuming that the deficiency of the antipellagric vitamin was concerned in bringing about the favorable influence on the rate of convulsions, it would not be unreasonable to expect a rise to appear after this fault had been corrected. On this assumption it is possible that the yeast used in treating the pellagra may have resulted in an overaction, though its use, in her case, was discontinued on August 27. She is one of five (cases 2, 4, 5, 6, and 9) who were treated for pellagra with yeast alone, but the only one to show this tendency to a conspicuous degree. Fleischmann's dry powdered yeast was used, and each patient received 30 grams daily. While this quantity proved to be ample for the prompt relief of all symptoms of pellagra in these five patients, it was not belived to be very much in excess of requirements, considering the restricted nature of the diet.

The observations presented in this report are given at their face value. As to how a diet of this character brings about a favorable influence on epilepsy, we have no explanations to offer. The high-fat, or ketogenic, diet introduced by Wilder [1] and used rather extensively by Peterman [2] in the treatment of epilepsy in children is thought by these authors to owe its beneficial effects to the anæsthetic action of ketone bodies. Geyelin [3] and Guelpa and Marie [4] had shown that fasting produced a favorable influence and, since the high-fat diet was believed by Wilder and Peterman to act similarly to fasting, it was suggested as a substitute for it. McQuarrie [5] believes that the dehydrating effect is the primary factor in both, while others are of the opinion that their therapeutic value is to be found in the controlling influence on alkalosis.

Greer [6] and Guthrie [7] report the development of pellagra-like symptoms in patients under treatment with a ketogenic diet which, with our own experience with such a diet, leads us to the opinion

[1] Wilder, R. M : Bull. Mayo Clinic, 2: 307 (1921).
[2] Peterman, M. G.: Am. J. Dis. Child., 28: 28 (1924).
[3] Geyelin, H. R.: M. Rec., 99: 1037 (1921).
[4] Guelpa, G., and Marie, A.: Bull. gen. de therap., 160: 616 (1910).
[5] McQuarrie, Irvine: J. Nutrition, 2: 31 (1929).
[6] Greer, Alvis E.: J. A. M. A., 95: 863 (1930).
[7] Guthrie, Riley H.: J. A. M. A., 95: 1912 (1930).

that the high-fat diets commonly used may also be low in the pellagra-preventive factor. It is noted that these authors are inclined to attribute the development of pellagra to the low protein in their diets, which is not necessarily the case. While many of the animal foods are good sources of both protein and the pellagra-preventive factor, the former exerts very little, if any, protective influence when used in purified form.[8] Furthermore, pellagra can be cured or prevented at will by the addition of a nitrogen-free watery extract of yeast[9] to an otherwise pellagra-producing diet. On the other hand, it has been demonstrated experimentally that both vegetable and animal fats, including butter, are notoriously deficient in the pellagra-preventive vitamin.

It is important to keep in mind the possible influence of physical enfeeblement on the frequency of epileptic seizures, whether it be brought about by acidosis, dehydration, pellagra, or some other cause. That the beneficial influence is more likely due to some associated metabolic change rather than the incidental physical debility is, however, indicated by the well-known fact that epilepsy itself often leads to extreme physical deterioration without the appearance of a favorable trend in the convulsions.

Whether a deficiency in the antipellagric vitamin is itself a direct factor, or whether, as seems more probable, pellagra, acidosis, and dehydration are merely common surface indications of a more specific and profound metabolic change is a question that can not be answered from the information at hand.

DEATH RATES IN A GROUP OF INSURED PERSONS

Rates for Principal Causes of Death for January, 1931

The accompanying table, taken from the Statistical Bulletin for February, 1931, issued by the Metropolitan Life Insurance Co., presents the mortality record of the industrial insurance department of the company for January, 1931, as compared with that for the preceding month and for the corresponding month of last year. It also gives a comparison of the rates for the years 1929 and 1930. The rates are based on a strength of approximately 19,000,000 insured persons in the United States and Canada.

With regard to health conditions in this group of persons during January, 1931, the Bulletin states:

> Despite the widespread prevalence of influenza in January of this year, the health record for the month is by no means a bad one. The mortality rate, in fact, was only 5.3 per cent in excess of that for the previous January, which was

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[8] Goldberger, Wheeler, Rogers, and Sebrell: Pub. Health Rep., 45: 273 (1930).
[9] Goldberger, Wheeler, Lillie, and Rogers: Pub. Health Rep., 41: 297 (1926).

the lowest ever registered for this group for the first month of the year. Among the Canadian policyholders, the mortality was actually 12.3 per cent lower than in January, 1930. Throughout the United States, however, the rate this year was somewhat higher. Five Januarys during the last 12-year period have recorded higher death rates than was registered this year, namely, in 1929, 1926, 1924, 1923, and 1920.

As invariably happens when there is widespread prevalence of even the milder type of influenza, there was observed this year a marked rise in the death rate from the more important chronic diseases, especially heart disease, cerebral hemorrhage, and cancer.

There are a number of distinctly encouraging items in the January mortality report. The death rate for diphtheria was at the very low figure of 6.8 per 100,000. This has never been even closely approached in any previous January. Prior to 1931 the minimum was 10.9 per 100,000—in 1930. Even with above-average prevalence of influenza, which would lead us to expect an increase in tuberculosis mortality, the tuberculosis death rate was more than 2 per cent lower than the previous minimum for the month (79.7 per 100,000 in 1930). The improvement has been limited, however, to policyholders in Canada and to those in the United States who live west of the Rocky Mountains. The death rate for puerperal diseases was only 11.1 per 100,000, as compared with 12.0 in January, 1930. There was a considerable drop in the suicide mortality and there were smaller declines for homicides and accidents.

The year has started inauspiciously with respect to automobile fatalities. The January death rate is higher than has been registered during this month in any previous year.

Death rates (annual basis) per 100,000 for principal causes of death

[Industrial insurance department, Metropolitan Life Insurance Co.]

Cause of death	Rate per 100,000 lives exposed [1]				
	January, 1931	December, 1930	January, 1930	Year	
				1930	1929
Total, all causes	989.5	844.6	940.1	870 2	934.2
Typhoid fever	1.4	2.8	1.1	2.4	2.4
Measles	2 6	1.1	2.1	2 8	3 0
Scarlet fever	3 3	1.9	3.8	2.5	2.7
Whooping cough	4.0	2 8	4 5	4 3	5 7
Diphtheria	6.8	6.7	10.9	5.9	8.8
Influenza	30.3	13.2	26.2	14.7	41.9
Tuberculosis (all forms)	78 0	69.5	79 7	80.5	86.9
Tuberculosis of respiratory system	69.9	61.7	69 8	70.1	76.7
Cancer	81 6	79 1	74.4	77.9	77.6
Diabetes mellitus	23 5	17.8	22 3	18 3	18.3
Cerebral hemorrhage	75.1	63 9	59 3	60.2	[2] 58.0
Organic diseases of heart	175.6	146 9	161 3	144.3	146.8
Pneumonia (all forms)	122 9	75 8	108 8	75.4	88.6
Other respiratory diseases	13.8	11 6	13 2	10.9	11.7
Diarrhea and enteritis	11.1	10.6	11.6	20.3	20.8
Bright's disease (chronic nephritis)	74.6	68.4	73.7	67.8	69.4
Puerperal state	11.1	9.8	12.0	12.1	13.6
Suicides	7.7	9.4	8.6	9.7	8.5
Homicides	6.8	7.1	7.0	6.7	6.6
Other external causes (excluding suicides and homicides)	58.2	59.5	61.3	62.2	65.2
Traumatism by automobiles	21.7	21.4	20.2	20.7	21.0
All other causes	200.9	186.7	198.4	191.3	197.7

[1] All figures in this table include insured infants under one year of age. The rates for 1930 and 1931 are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.
[2] Rate not comparable with that for later years.

COURT DECISION RELATING TO PUBLIC HEALTH

Regulations requiring vaccination before admission to school and prescribing method of vaccination upheld.—(Arkansas Supreme Court; Allen et al. *v.* Ingalls et al., 33 S. W. (2d) 1099; decided Dec. 22, 1930.) Acting under statutory authority to make all necessary and reason able rules for the protection of the public health and the suppression and prevention of communicable diseases, the State board of health adopted rules making vaccination against smallpox a prerequisite to school attendance and defining vaccination as "the introduction, by scarification, of the bovine vaccine virus through the skin." To enforce such regulations the school board of Eureka Springs made a rule requiring the presentation of a physician's certificate relative to vaccination. Certain children presented the certificate of a regularly licensed homeopathic physician as to their vaccination by him, the homeopathic method having been used. The school board refused to admit these children to school, claiming that the certificate of vaccination did not meet the requirements of the rules of the State board of health. At the time smallpox was not present in the community nor was its appearance reasonably apprehended. In a mandamus proceeding to compel the school board to admit the said children to school, the supreme court upheld the rules of the State board of health making vaccination a prerequisite to school attendance and prescribing the method of vaccination. The court said:

Although it is undisputed that there was no smallpox in the city of Eureka Springs nor in the county at the time the appellant's children were denied the right to attend the public schools, which they were otherwise entitled to do, except for the failure to present a satisfactory certificate of vaccination to the board in accordance with the rules, and the testimony showed that there was no condition existing from which its appearance could be reasonably apprehended, the case is not distinguished from Brazil *v.* State, supra, where a like condition was shown to exist and the adoption and promulgation of a like rule was held to be neither unreasonable nor unnecessary. * * *

It is true that the State board of health in its regulation No. 84 defines vaccination for smallpox as "the introduction, by scarification, of the bovine vaccine virus through the skin," and that there is no definition of the term in the statute granting power to the board, although there is no doubt but that the legislature had the power to prescribe such method required to be used by the State board in protection of the public health, when the necessity arose therefor. The majority is of opinion * * * that the power to prescribe the method for vaccination against smallpox was necessarily impliedly granted, and the statute granting powers and prescribing the duties of the State board of health and that the regulations made by it prescribing the method of vaccination was not arbitrary, but only a reasonable exercise of such power. That the method for vaccination prescribed by the board was but an expression of the meaning of the term in accordance with the common knowledge of mankind, and as understood by the consensus of opinion of the medical profession and practiced by a great majority thereof; the term, itself, meaning the method as defined by the board as effectually as though it had been so defined in the statute. * * *

In upholding the action of the school board, the court stated as follows:

The majority is also of opinion that the school board did not abuse its discretion in requiring, as prerequisite to the entry of pupils in the public schools, which they were otherwise entitled to attend, the presentation of "a certificate from a licensed and competent physician of the State that the pupil has been successfully vaccinated" in accordance with rule No. 147, prescribed by the State board of health, and that such school board was not concluded by the certificate of vaccination presented by the pupils from a licensed physician that they had been vaccinated against smallpox, but could nevertheless inquire into the method used in performing the act of vaccination and deny the children the right to enter school, if it had not been done by the method prescribed by the State board of health. * * *

DEATHS DURING WEEK ENDED MARCH 21, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended March 21, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended March 21, 1931	Corresponding week, 1930
Policies in force	75, 080, 202	75, 593, 686
Number of death claims	15, 823	15, 822
Death claims per 1,000 policies in force, annual rate	11. 0	10. 9

Deaths [1] from all causes in certain large cities of the United States during the week ended March 21, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Mar. 21, 1931				Corresponding week. 1930		Death rate [2] for the first 12 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (81 cities)	9, 249	13. 6	875	[4] 69	13. 3	785	14. 1	13. 3
Akron	47	9. 5	3	30	10. 8	3	8. 6	8. 9
Albany [5]	36	14. 5	1	20	18 4	2	15. 1	16. 8
Atlanta	88	16. 5	6	61	16. 9	7	17. 1	17. 6
White	44		3	48		3		
Colored	44	(6)	3	86	(6)	4	(6)	(6)
Baltimore [5]	276	17. 7	37	125	17. 3	26	17. 7	15. 8
White	205		20	87		22		
Colored	71	(6)	17	266	(6)	4	(6)	(6)
Birmingham	96	18. 6	11	111	13. 1	6	15. 4	14. 4
White	47		5	86		1		
Colored	49	(6)	6	146	(6)	5	(6)	(6)
Boston	220	14. 6	15	43	17. 7	28	17. 0	16. 0
Bridgeport	39	13. 8	3	50	11. 7	2	13. 6	14. 1
Buffalo	183	16. 4	17	69	13. 9	16	15. 4	14. 4
Cambridge	29	13. 2	3	60	16. 0	5	14. 2	14. 2
Camden	42	18. 4	14	244	13. 2	4	18. 7	14. 8
Canton	29	14. 2	5	114	10. 4	3	11. 5	11. 8
Chicago [5]	729	11. 0	70	62	12. 0	68	12. 1	11. 8
Cincinnati	166	18. 9	10	60	16. 1	13	18. 0	17. 6
Cleveland	223	12. 8	17	49	12. 0	24	12. 5	12. 3
Columbus	72	12. 7	11	107	17. 2	7	14. 7	15. 2

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended March 21, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

City	Week ended Mar. 21, 1931				Corresponding week, 1930		Death rate for the first 12 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
Dallas	66	12.7	4		11.1	7	12.5	12.7
White	44		3			4		
Colored	22	[6]	1		[6]	3	[6]	[6]
Dayton	53	13.4	3	42	10.6	3	14.1	10.6
Denver	83	14.8	4	39	17.0	9.	16.0	15.7
Des Moines	45	16.2	1	18	10.6	1	12.8	13.0
Detroit	296	9.3	42	67	10.3	46	9.7	10.5
Duluth	21	10.8	3	74	12.3	4	12.2	11.8
El Paso	27	13.4	6		17.7	2	18.8	18.7
Erie	22	9.7	3	56	13.4	3	11.1	11.5
Fall River [6, 7]	34	15.4	2	45	14.5	3	13.9	13.9
Flint	22	7.0	2	26	10.6	6	8.1	10.3
Fort Worth	46	14.3	7		13.3	2	11.9	12.6
White	36		6			0		
Colored	10	[6]	1		[6]	2	[6]	[6]
Grand Rapids	37	11.2	5	74	9.6	4	9.9	11.2
Houston	50	8.4	2		10.9	4	11.9	13.3
White	30		2			2		
Colored	20	[6]	0		[6]	2	[6]	[6]
Indianapolis	118	16.6	8	66	13.8	3	15.6	16.3
White	97		5	47		2		
Colored	21	[6]	3	201	[6]	1	[6]	[6]
Jersey City	66	10.8	12	107	10.7	11	13.8	12.6
Kansas City, Kans	30	12.7	3	62	9.8	2	16.4	12.6
White	23		3	74		2		
Colored	7	[6]	0	0	[6]	0	[6]	[6]
Kansas City, Mo	126	16.1	11	83	15.1	8	15.7	14.5
Knoxville	27	12.9	3	64	25.0	7	14.5	15.7
White	17		3	71		6		
Colored	10	[6]	0	0	[6]	1	[6]	[6]
Long Beach	40	13.7	1	24	11.2	0	10.9	10.6
Los Angeles	274	10.8	22	64	12.9	20	12.0	12.3
Louisville	61	10.3	6	51	18.1	9	18.1	14.7
White	46		4	39		8		
Colored	15	[6]	2	133	[6]	1	[6]	[6]
Lowell [7]	30	15.5	5	127	12.9	3	15.0	15.8
Lynn	29	14.7	1	26	10.7	2	13.0	12.7
Memphis	70	14.1	8	85	20.9	4	17.9	18.1
White	30		1	17		2		
Colored	40	[6]	7	203	[6]	2	[6]	[6]
Miami	28	13.0	4	101	16.4	4	14.7	13.7
White	22		3	106		2		
Colored	6	[6]	1	88	[6]	2	[6]	[6]
Milwaukee	114	10.1	15	65	11.1	20	10.7	10.9
Minneapolis	121	13.3	17	110	11.1	8	12.5	11.6
Nashville	53	17.8	3	45	17.6	6	18.4	17.0
White	38		3	60		4		
Colored	15	[6]	0	0	[6]	2	[6]	[6]
New Bedford [7]	30	13.9	6	159	9.7	2	13.4	12.3
New Haven	41	13.1	1	19	14.7	6	13.6	15.1
New Orleans	178	19.9	14	77	19.6	25	19.9	19.8
White	98		5	41		5		
Colored	80	[6]	9	147	[6]	20	[6]	[6]
New York	1,717	12.6	165	69	12.1	146	13.7	12.1
Bronx Borough	225	8.8	23	52	9.6	18	9.9	8.7
Brooklyn Borough	614	12.2	60	64	11.0	67	12.8	11.3
Manhattan Borough	664	19.1	65	111	17.7	43	20.8	17.9
Queens Borough	181	8.2	16	44	7.9	14	9.0	7.9
Richmond Borough	33	10.5	1	18	13.7	4	14.5	15.3
Newark, N. J	110	12.9	11	58	13.4	12	14.1	14.4
Oakland	77	13.7	3	38	12.4	0	12.4	12.5
Oklahoma City	49	13.0	8	110	11.7	5	11.8	10.6
Omaha	66	15.9	5	56	13.9	5	15.1	14.5
Paterson	42	15.8	1	17	15.1	5	16.0	13.6
Philadelphia	580	15.4	59	86	14.5	37	16.2	14.0
Pittsburgh	220	17.0	23	79	14.4	20	18.2	15.7
Portland, Oreg	91	15.5	4	49	15.7	6	13.2	14.2
Providence	75	15.8	6	55	14.0	6	15.7	15.5

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended March 21, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

City	Week ended Mar. 21, 1931				Corresponding week, 1930		Death rate for the first 12 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
Richmond	60	17.0	9	131	13.9	1	18.0	16.7
White	41		6	131		0		
Colored	19	(6)	3	130	(6)	1	(6)	(6)
Rochester	87	13.7	9	82	12.2	5	14.1	12.9
St. Louis	272	17.1	11	37	16.4	12	18.4	15.3
St. Paul	88	16.6	7	72	11.3	2	11.7	11.4
Salt Lake City [5]	39	14.2	1	15	14.4	3	13.2	14.0
San Antonio	65	14.1	11		13.2	11	15.3	18.9
San Diego	43	14.3	2	41	14.6	2	15.8	16.0
San Francisco	176	14.1	8	53	13.3	4	15.0	14.3
Schenectady	22	11.9	2	59	11.4	1	11.7	11.7
Seattle	106	14.9	4	38	13.4	2	13.2	12.2
Somerville	23	11.4	1	37	10.0	3	11.7	12.5
South Bend	25	12.1	2	50	7.9	0	9.3	9.9
Spokane	44	19.7	4	104	9.5	1	13.5	13.1
Springfield, Mass	32	11.0	2	31	13.2	5	14.4	14.8
Syracuse	61	14.9	8	95	10.4	5	13.2	13.2
Tacoma	33	16.0	1	26	18.0	1	15.8	13.5
Toledo	91	16.1	12	110	11.4	4	13.6	14.2
Trenton	35	14.7	1	17	16.9	5	19.6	18.5
Utica	32	16.3	1	26	14.8	5	16.5	15.6
Washington, D. C	178	18.8	21	116	15.7	13	18.6	16.1
White	109		14	114		4		
Colored	69	(6)	7	120	(6)	9	(6)	(6)
Waterbury	20	10.3	7	211	12.5	1	11.4	11.4
Wilmington, Del.[7]	34	16.6	2	43	15.2	3	16.6	16.0
Worcester	64	16.9	6	82	13.3	0	15.3	15.5
Yonkers	36	13.5	4	105	10.4	1	10.8	9.2
Youngstown	43	13.0	7	98	10.7	5	11.9	11.0

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 76 cities
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31, Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14, Houston, 25; Indianapolis, 11; Kansas City, Kans, 14; Knoxville, 15; Louisville, 17, Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32, and Washington, D. C, 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended March 28, 1931, and March 29, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended March 28, 1931, and March 29, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Mar. 28, 1931	Week ended Mar. 29, 1930	Week ended Mar. 28, 1931	Week ended Mar. 29, 1930	Week ended Mar. 28, 1931	Week ended Mar. 29, 1930	Week ended Mar. 28, 1931	Week ended Mar. 29, 1930
New England States:								
Maine	3	5	12	18	50	77	1	0
New Hampshire		1	1	11	55	4	0	0
Vermont		2			5	60	0	0
Massachusetts	42	67	5	20	430	1,006	1	5
Rhode Island	3	7			32	7	0	0
Connecticut	6	14	36	12	870	13	1	1
Middle Atlantic States:								
New York	142	125	[1] 24	[1] 62	2,289	1,012	12	24
New Jersey	68	112	23	21	820	747	5	4
Pennsylvania	88	105			3,905	1,272	18	7
East North Central States:								
Ohio	25	77	177	38	721	709	5	11
Indiana	32	22	46		848	95	6	
Illinois	133	158		176	1,386	727	18	22
Michigan	38	81	47	2	127	1,221	6	38
Wisconsin	13	14	204	40	660	787	3	7
West North Central States:								
Minnesota	23	19	1	4	129	230	0	8
Iowa	5	13			13	603	5	4
Missouri	78	33	81	9	366	66	16	19
North Dakota	8	2			89	22	0	5
South Dakota	10	5	3	1	78	102	1	1
Nebraska	10	14	3		6	411	1	2
Kansas	14	13	12	14	18	731	1	8
South Atlantic States:								
Delaware	2	2	5		126	8	0	0
Maryland [2]	20	18	125	55	1,422	48	1	1
District of Columbia	13	15		2	280	10	2	0
Virginia							2	
West Virginia	9	5	205	28	106	79	1	0
North Carolina	23	31	75	14	814	29	5	2
South Carolina	11	22	1,857	832	100	80	3	0
Georgia [3]	5	5	549	137	114	196	1	7
Florida [3]	4	3	28	2	152	424	2	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever: 1931, 2 cases; 1 case in Georgia and 1 case in Florida.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended March 28, 1931, and March 29, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Mar. 28, 1931	Week ended Mar. 29, 1930	Week ended Mar. 28, 1931	Week ended Mar. 29, 1930	Week ended Mar. 28, 1931	Week ended Mar. 29, 1930	Week ended Mar. 28, 1931	Week ended Mar. 29, 1930
East South Central States:								
Kentucky					301		2	1
Tennessee	12	15	270	71	250	186	6	25
Alabama	19	22	761	76	467	[illegible]	19	4
Mississippi	7	13					0	21
West South Central States:								
Arkansas	3	15	279	105	33	25	4	9
Louisiana	13	23	47	9	9	151	4	6
Oklahoma [4]	11	17	158	70	14	538	0	2
Texas	29	31	86	129	99	134	1	1
Mountain States:								
Montana	1	1			7		0	2
Idaho		2	2		1	75	0	1
Wyoming	1	1		1	3	5	0	0
Colorado	13	9		2	207	487	1	2
New Mexico	5	17	18		55	141	0	4
Arizona	4	7	40	11	190	53	3	5
Utah [2]				2	3	276	2	10
Pacific States:								
Washington	5	8	72		46	282	2	7
Oregon	4	17	219	44	97	130	0	0
California	55	51	229	38	1,796	2,173	4	6

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Mar. 28, 1931	Week ended Mar. 29, 1930	Week ended Mar. 28, 1931	Week ended Mar. 29, 1930	Week ended Mar. 28, 1931	Week ended Mar. 29, 1930	Week ended Mar. 28, 1931	Week ended Mar. 29, 1930
New England States:								
Maine	0	0	22	32	0	0	0	6
New Hampshire	0	1	6	16	0	0	0	2
Vermont	0	0	7	7	0	4	0	0
Massachusetts	1	0	115	274	0	0	1	2
Rhode Island	0	0	67	23	0	0	0	0
Connecticut	0	0	85	115	0	0	0	2
Middle Atlantic States:								
New York	2	2	1,050	607	13	3	9	34
New Jersey	1	0	305	270	0	0	4	2
Pennsylvania	1	0	455	432	0	1	8	14
East North Central States:								
Ohio	4	0	432	564	80	186	4	9
Indiana	0	0	318	176	75	162	1	3
Illinois	0	0	584	516	37	122	2	8
Michigan	0	1	387	292	18	123	2	0
Wisconsin	0	0	191	118	9	38	1	1
West North Central States:								
Minnesota	0	0	97	146	14	4	1	3
Iowa	0	0	80	95	70	99	0	1
Missouri	0	0	368	105	51	51	14	4
North Dakota	0	0	54	21	8	18	0	3
South Dakota	0	0	19	8	14	70	3	0
Nebraska	0	0	69	56	49	39	0	0
Kansas	1	0	76	136	112	88	0	2
South Atlantic States:								
Delaware	0	0	21	11	0	0	0	1
Maryland [2]	0	0	87	116	0	0	6	3
District of Columbia	0	0	30	13	0	0	0	0
Virginia								
West Virginia	0	0	31	24	12	22	6	17
North Carolina	0	3	37	37	1	40	2	2
South Carolina	2	0	4	12	0	1	9	3
Georgia [3]	0	0	60	25	0	0	3	1
Florida [3]	0	0	3	11	3	1	4	2

[2] Week ended Friday.
[3] Typhus fever: 1931, 2 cases; 1 case in Georgia; and 1 case in Florida.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended March 28, 1931, and March 29, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Mar. 28, 1931	Week ended Mar. 29, 1930	Week ended Mar. 28, 1931	Week ended Mar. 29, 1930	Week ended Mar. 28, 1931	Week ended Mar. 29, 1930	Week ended Mar. 28, 1931	Week ended Mar. 29, 1930
East South Central States:								
Kentucky	0	0	49	75	10	19	2	3
Tennessee	0	1	51	78	33	9	7	6
Alabama	0	0	23	21	8	11	2	6
Mississippi	0	0	14	10	38	6	2	2
West South Central States:								
Arkansas	0	0	14	22	26	10	2	1
Louisiana	0	0	20	25	26	2	8	8
Oklahoma [4]	0	0	37	52	52	117	8	4
Texas	0	3	37	63	45	86	2	2
Mountain States:								
Montana	0	0	21	39	6	17	1	3
Idaho	0	0	6	5	1	12	0	1
Wyoming	0	0	16	5	4	2	1	0
Colorado	0	0	31	29	7	6	0	2
New Mexico	0	0	6	10	0	21	0	0
Arizona	0	0	8	16	0	28	2	4
Utah [2]	0	0	18	18	0	0	0	0
Pacific States:								
Washington	0	0	38	40	25	83	7	2
Oregon	0	0	20	37	16	23	5	0
California	2	2	162	180	46	120	5	1

[2] Week ended Friday.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
February, 1931										
California	30	220	1,636	2	3,794	1	25	556	258	47
Delaware	-	3	114	-	65	-	0	105	0	0
Montana	3	8	44	-	10	-	1	196	13	6
Nevada	1	4	65	-	39	-	0	5	0	-
North Carolina	20	114	1,534	-	1,446	72	2	274	8	8
Oklahoma [1]	14	95	997	49	109	29	1	141	369	17
Oregon	-	41	197	-	332	-	3	104	104	1
Pennsylvania	48	405	-	1	8,128	1	4	2,359	1	55
South Carolina	-	108	14,536	508	583	258	2	58	14	15
South Dakota	5	29	31	-	62	-	2	93	118	1
Texas	4	192	290	348	-	3	0	183	-	35
Virginia	11	147	12,167	13	2,795	32	2	344	8	28
Washington	1	67	153	-	198	-	3	242	125	7
Wisconsin	4	63	738	-	1,326	-	2	631	28	8

[1] Exclusive of Oklahoma City and Tulsa.

February, 1931

	Cases
Actinomycosis:	
California	1
Montana	1
Chicken pox:	
California	2,710
Delaware	37
Montana	109
Nevada	13
Chicken pox—Continued	
North Carolina	813
Oklahoma [1]	100
Oregon	206
Pennsylvania	3,989
South Carolina	422
South Dakota	127
Virginia	833
Washington	455
Wisconsin	1,688

[1] Exclusive of Oklahoma City and Tulsa.

	Cases
Conjunctivitis:	
Montana	1
Oklahoma [1]	3
Dengue:	
South Carolina	32
Diarrhea:	
South Carolina	358
Diarrhea and dysentery:	
Virginia	197
Dysentery:	
California (amebic)	9
California (bacillary)	13
Montana	1
Oklahoma [1]	4
Pennsylvania	1
South Carolina (amebic)	1
Food poisoning:	
California	13
German measles:	
California	91
Montana	6
South Carolina	1,756
Pennsylvania	209
South Carolina	17
Washington	195
Hookworm disease:	
South Carolina	82
Impetigo contagiosa:	
Montana	1
Oregon	37
Washington	15
Jaundice:	
California	1
Lead poisoning:	
Pennsylvania	1
Leprosy:	
California	2
Lethargic encephalitis:	
California	3
Pennsylvania	6
Wisconsin	3
Mumps:	
California	1,217
Delaware	23
Montana	161
Nevada	50
Oklahoma [1]	20
Oregon	304
Pennsylvania	1,584
South Carolina	173
South Dakota	24
Washington	235
Wisconsin	2,351
Ophthalmia neonatorum:	
California	1
Montana	1
North Carolina	3
Pennsylvania	17
South Carolina	13
Washington	1
Paratyphoid fever:	
California	2
Puerperal fever:	
Pennsylvania	18
South Dakota	1
Rabies in animals:	
California	80
Delaware	3
Rocky Mountain spotted or tick fever:	
Oregon	1
Scabies:	
Oregon	20
Septic sore throat:	
Montana	4
North Carolina	10
Oklahoma [1]	52
Oregon	2
South Carolina	20
Tetanus:	
California	1
Pennsylvania	5
South Carolina	1
Trachoma:	
California	19
Montana	2
North Carolina	2
Oklahoma [1]	4
Pennsylvania	1
South Dakota	4
Trichinosis:	
California	5
Pennsylvania	11
Tularaemia:	
North Carolina	2
Pennsylvania	4
South Carolina	1
Virginia	2
Undulant fever:	
California	6
Montana	1
Pennsylvania	2
Washington	1
Wisconsin	1
Vincent's angina:	
Oklahoma [1]	1
Oregon	19
Washington	1
Whooping cough:	
California	744
Delaware	20
Montana	165
Nevada	2
North Carolina	386
Oklahoma [1]	26
Oregon	78
Pennsylvania	801
South Carolina	213
South Dakota	16
Virginia	384
Washington	226
Wisconsin	501

[1] Exclusive of Oklahoma City and Tulsa.

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of February, 1931, by departments of health of certain States to other State health departments

Disease	Illinois	Kansas	Minnesota	New York	Oregon
Gonorrhea			1		
Scarlet fever				1	
Smallpox	1				
Syphilis		10			
Tuberculosis	11		30		8

SEPTIC SORE THROAT AT OXFORD, OHIO

The Ohio Health News, published by the State Department of Health of Ohio, reports an outbreak of septic sore throat at Western College for Women at Oxford, Ohio. On March 13, 1931, 50 cases were found, mostly among students; 6 cases were reported on March 14, and 1 case on March 15.

The dairy plant operated by the college was found to be insanitary, with unsatisfactory methods of handling the product, and on March 14 it was closed by order of the State director of health.

The investigation developed the probability of a carrier among the five persons regularly employed at the plant.

The health authorities, State and local, and the State department of agriculture have cooperated, and the crisis is said to have passed.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 95 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,055,000. The estimated population of the 88 cities reporting deaths is more than 31,510,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended March 21, 1931, and March 22, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	932	1,249	
95 cities	415	607	854
Measles:			
45 States	17,548	14,456	
95 cities	6,514	4,886	
Meningococcus meningitis:			
46 States	155	295	
95 cities	88	121	
Poliomyelitis:			
46 States	20	14	
Scarlet fever:			
46 States	5,918	5,093	
95 cities	2,438	1,957	1,597
Smallpox:			
46 States	985	1,417	
95 cities	133	152	66
Typhoid fever:			
46 States	115	202	
95 cities	27	38	22
Deaths reported			
Influenza and pneumonia:			
88 cities	1,304	1,036	
Smallpox:			
88 cities	0	0	

City reports for week ended March 21, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the reult of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	19	1	0		0	2	18	3
New Hampshire:								
Concord	0	0	0		0	2	0	1
Vermont:								
Barre	2	0	0		0	0	0	0
Massachusetts:								
Boston	75	32	17	3	1	180	16	21
Fall River	2	3	6		0	0	14	6
Springfield	5	3	1		0	1	4	0
Worcester	14	3	0		0	4	9	7
Rhode Island:								
Pawtucket	7	1	0		1	2	0	1
Providence	10	8	3		1	0	5	13
Connecticut:								
Bridgeport	3	6	0	6	2	1	3	7
Hartford	1	5	1	4	2	45	0	11
New Haven	23	1	0	1	1	398	20	6
MIDDLE ATLANTIC								
New York:								
Buffalo	26	11	8	7	4	306	83	41
New York	388	231	102	47	22	1,124	63	241
Rochester	6	8	0	2	1	4	7	11
Syracuse	27	5	2		1	30	2	8
New Jersey:								
Camden	6	5	1		0	27	7	12
Newark	106	16	9	12	1	6	8	10
Trenton	10	3	0	6	0	5	1	3
Pennsylvania:								
Philadelphia	161	63	16	16	15	874	37	100
Pittsburgh	88	18	6	8	8	92	51	53
Reading	6	2	0		0	122	27	5
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	6	9	1		5	108	25	10
Cleveland	170	29	10	79	8	31	219	35
Columbus	29	3	2	4	5	5	2	14
Toledo	42	4	2	3	3	2	15	8
Indiana:								
Fort Wayne	2	2	11		1	57	0	3
Indianapolis	56	5	1		0	227	1	16
South Bend		2						
Terre Haute	1	0	1		0	4	0	4
Illinois:								
Chicago	125	96	68	26	10	223	60	67
Springfield	16	1	1	1	0	207	6	2
Michigan:								
Detroit	126	44	19	10	10	5	32	41
Flint	11	3	0	30	3	1	1	6
Grand Rapids	7	1	0	2	2	2	0	4
Wisconsin:								
Kenosha	8	0	0		0	0	74	0
Madison	31	0	1			0	43	
Milwaukee	159	14	4	2	2	45	415	12
Racine	13	1	0		0	4	3	0
Superior	11	0	0		0	1	0	1

City reports for week ended March 21, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST NORTH CENTRAL								
Minnesota:								
Duluth	6	0	0	----------	0	0	0	0
Minneapolis	117	14	7	----------	2	75	141	13
St. Paul	66	7	1	9	9	22	1	12
Iowa:								
Davenport	0	1	0	----------	----------	1	0	----------
Des Moines	7	1	0	----------	----------	0	5	----------
Sioux City	19	0	0	----------	----------	8	19	----------
Waterloo	2	0	0	----------	----------	0	1	----------
Missouri:								
Kansas City	50	5	9	----------	3	60	1	27
St. Joseph	1	0	2	----------	0	0	0	5
St. Louis	20	38	14	10	1	90	17	----------
North Dakota:								
Fargo	5	0	0	----------	0	0	8	1
Grand Forks	0	0	0	----------	----------	0	2	----------
South Dakota.								
Aberdeen	18	0	0	----------	----------	1	0	----------
Sioux Falls	0	0	2	----------	----------	0	0	----------
Nebraska:								
Omaha	28	3	4	----------	0	0	7	10
Kansas:								
Topeka	13	1	1	3	0	0	22	1
Wichita	10	2	0	----------	1	2	1	4
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	2	3	----------	0	26	5	3
Maryland:								
Baltimore	143	22	5	19	2	1,053	38	54
Cumberland	0	1	0	1	1	1	0	3
Frederick	0	0	0	----------	0	1	0	1
District of Columbia:								
Washington	51	11	9	5	3	223	0	31
Virginia:								
Lynchburg	24	1	1	----------	0	10	2	2
Norfolk	33	2	3	----------	0	74	2	10
Richmond	0	3	8	----------	1	222	0	2
Roanoke	11	1	0	----------	1	1	1	2
West Virginia:								
Charleston	2	0	1	6	1	0	8	2
Wheeling	27	0	0	1	3	0	0	3
North Carolina:								
Raleigh	1	0	1	----------	0	39	0	5
Wilmington	3	0	0	----------	0	1	0	0
Winston-Salem	7	0	2	1	0	20	6	1
South Carolina:								
Charleston	1	1	1	45	2	20	1	5
Columbia	3	0	0	----------	0	1	2	8
Greenville	0	0	1	----------	0	0	0	0
Georgia:								
Atlanta	13	3	1	92	10	32	0	9
Brunswick	0	0	0	----------	0	0	11	2
Savannah	2	1	0	7	0	0	10	2
Florida:								
Miami	16	3	2	5	1	4	0	3
Tampa	1	1	5	1	1	93	1	1
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0	4	1	13	0	4
Tennessee:								
Memphis	----------	4	----------	----------	----------	----------	----------	----------
Nashville	0	1	1	----------	2	27	0	7
Alabama:								
Birmingham	6	2	0	48	8	88	0	11
Mobile	0	0	0	----------	3	1	0	2
Montgomery	15	0	0	3	----------	1	1	----------

City reports for week ended March 21, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	2	0	0	----------	----------	2	0	----------
Little Rock	0	1	0	0	0	0	0	3
Louisiana:								
New Orleans	5	13	9	8	4	0	0	21
Shreveport	3	0	0	----------	0	0	3	4
Oklahoma:								
Muskogee	3	0	0	16	0	0	0	0
Texas:								
Dallas	49	5	5	6	3	6	26	12
Fort Worth	15	3	3	----------	1	0	1	7
Galveston	0	1	0	----------	0	0	0	1
Houston	3	5	4	----------	0	5	1	5
San Antonio	1	3	3	----------	3	2	2	6
MOUNTAIN								
Montana:								
Billings	5	0	0	----------	0	0	0	1
Great Falls	12	1	0	----------	1	0	0	0
Helena	0	0	0	----------	0	0	0	0
Missoula	0	0	0	16	1	0	0	1
Idaho:								
Boise	0	0	0	----------	0	0	0	0
Colorado:								
Denver	86	8	1	----------	1	23	38	10
Pueblo	----------	0	----------	----------	----------	----------	----------	----------
New Mexico:								
Albuquerque	19	0	0	----------	1	1	2	1
Arizona:								
Phoenix	4	1	0	----------	0	1	0	8
Utah:								
Salt Lake City	4	2	1	----------	1	0	8	1
Nevada:								
Reno	0	0	0	3	0	0	0	0
PACIFIC								
Washington:								
Seattle	35	3	1	----------	----------	3	45	----------
Spokane	6	1	0	----------	----------	0	0	----------
Tacoma	14	2	1	----------	3	1	1	8
Oregon:								
Portland	29	7	0	34	1	19	9	6
Salem	3	0	0	1	0	4	15	0
California:								
Los Angeles	91	40	18	99	4	178	19	17
Sacramento	9	1	2	23	1	3	6	7
San Francisco	88	15	4	113	6	16	15	10

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases, reported	Cases, estimated expectancy	Cases, reported	Deaths, reported		Cases, estimated expectancy	Cases, reported	Deaths, reported		
NEW ENGLAND											
Maine:											
Portland	4	29	0	0	0	2	0	0	0	18	30
New Hampshire:											
Concord	0	1	0	0	0	2	0	0	0	0	12
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	10	2
Massachusetts:											
Boston	84	144	0	0	0	14	1	1	1	40	220
Fall River	5	7	0	0	0	2	0	0	0	1	34
Springfield	9	16	0	0	0	4	0	0	0	5	36
Worcester	10	21	0	0	0	4	0	0	0	16	64

City reports for week ended March 21, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases, reported	Cases, estimated expectancy	Cases, reported	Deaths, reported		Cases, estimated expectancy	Cases, reported	Deaths, reported		
NEW ENGLAND—continued											
Rhode Island:											
Pawtucket	2	12	0	0	0	0	0	0	0	5	24
Providence	13	22	0	0	0	7	0	0	0	1	75
Connecticut:											
Bridgeport	12	13	0	0	0	3	0	0	0	5	39
Hartford	7	15	0	0	0	1	0	0	0	2	45
New Haven	11	1	0	0	0	0	0	0	0	6	41
MIDDLE ATLANTIC											
New York:											
Buffalo	30	23	0	0	0	13	0	0	0	27	80
New York	353	494	0	0	0	102	8	2	0	163	1,717
Rochester	11	92	0	0	0	2	0	0	0	13	84
Syracuse	12	17	0	0	0	1	0	0	0	4	61
New Jersey:											
Camden	6	5	0	0	0	0	0	0	0	0	42
Newark	46	34	0	0	0	7	0	1	0	25	117
Trenton	5	16	0	0	0	3	0	1	0	3	35
Pennsylvania:											
Philadelphia	103	160	0	0	0	38	1	0	0	27	580
Pittsburgh	31	34	0	0	0	9	0	0	0	35	220
Reading	5	2	0	0	0	0	0	0	0	0	44
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	21	37	2	0	0	10	1	0	0	12	166
Cleveland	51	85	0	0	0	16	0	0	0	19	223
Columbus	11	12	2	0	0	5	0	0	0	1	72
Toledo	14	11	1	3	0	9	1	0	0	5	91
Indiana:											
Fort Wayne	6	6	1	0	0	2	0	0	0	1	33
Indianapolis	12	74	8	12	0	3	0	0	0	36	-
South Bend	3	-	0	-	-	-	0	-	-	-	-
Terre Haute	3	1	1	0	0	0	0	0	0	3	23
Illinois:											
Chicago	138	235	2	1	0	43	1	1	0	56	729
Springfield	2	8	0	0	0	0	0	0	0	0	33
Michigan:											
Detroit	121	139	2	0	0	22	0	0	0	67	296
Flint	15	16	2	0	0	2	0	0	0	2	22
Grand Rapids	11	11	0	0	0	0	1	2	0	7	37
Wisconsin:											
Kenosha	3	2	0	0	0	0	0	0	0	0	6
Madison	5	8	0	0	-	-	-	0	-	2	-
Milwaukee	31	19	0	0	0	7	0	0	0	23	114
Racine	4	4	0	0	0	2	0	0	0	9	15
Superior	4	2	0	0	0	0	0	0	0	0	7
WEST NORTH CENTRAL											
Minnesota:											
Duluth	10	2	0	0	0	1	0	0	0	0	21
Minneapolis	45	11	1	1	0	2	0	0	0	20	121
St. Paul	34	7	0	0	0	2	0	0	0	21	95
Iowa:											
Davenport	1	3	1	9	-	-	0	0	-	0	-
Des Moines	11	6	1	8	-	-	0	0	-	2	45
Sioux City	2	9	0	0	-	-	0	0	-	1	-
Waterloo	3	4	0	0	-	-	0	0	-	0	-
Missouri:											
Kansas City	25	13	2	1	0	7	0	0	0	12	126
St. Joseph	2	3	1	2	0	0	0	0	0	0	26
St. Louis	35	242	2	4	0	7	1	3	0	15	272
North Dakota:											
Fargo	3	6	0	0	0	1	0	0	0	2	7
Grand Forks	0	0	0	0	-	-	0	0	-	0	-

City reports for week ended March 21, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases, reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases, reported	Smallpox: Deaths, reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases, reported	Typhoid fever: Deaths, reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—con.											
South Dakota:											
Aberdeen	1	0	0	0			0	0		0	
Sioux Falls	2	1	0	1			0	0		0	6
Nebraska:											
Omaha	4	8	3	18	0	5	0	1	0	1	66
Kansas:											
Topeka	2	0	0	1	0	0	0	0	0	0	20
Wichita	3	3	1	41	0	1	0	0	0	5	27
SOUTH ATLANTIC											
Delaware:											
Wilmington	6	9	0	0	0	0	0	0	0	1	34
Maryland:											
Baltimore	38	42	0	0	0	17	1	0	0	19	276
Cumberland	1	0	0	0	0	1	0	0	0	0	11
Frederick	0	0	0	0	0	0	0	0	0	1	4
District of Columbia:											
Washington	27	32	1	0	0	14	0	1	1	5	178
Virginia:											
Lynchburg	0	0	0	0	0	0	0	0	0	0	12
Norfolk	2	0	0	0	0	2	0	0	0	10	
Richmond	4	4	0	0	0	6	0	0	0	7	57
Roanoke	1	0	0	0	0	1	0	0	0	5	17
West Virginia:											
Charleston	1	0	0	0	0	1	0	0	0	5	17
Wheeling	2	0	0	0	0	1	0	0	0	0	24
North Carolina:											
Raleigh	0	2	1	0	0	0	0	0	0	22	12
Wilmington	0	0	0	0	0	0	0	0	0	7	15
Winston-Salem	1	0	1	0	0	4	0	0	0	6	13
South Carolina:											
Charleston	0	0	0	0	0	1	0	0	0	0	26
Columbia	0	0	0	0	0	0	0	0	0	0	24
Greenville	0	0	0	0	0	0	0	0	0	0	
Georgia:											
Atlanta	6	83	2	0	0	7	0	5	0	0	80
Brunswick	0	0	0	0	0	1	0	0	0	0	6
Savannah	0	1	0	0	0	1	0	2	0	0	32
Florida:											
Miami	1	1	0	0	0	3	0	0	0	2	28
Tampa	0	0	0	0	0	3	1	0	0	3	23
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	8	0	0	0	1	0	0	0	0	19
Tennessee:											
Memphis	10		1				1				
Nashville	3	9	0	0	0	3	0	0	0	8	53
Alabama:											
Birmingham	3	8	1	0	0	7	0	0	0	3	96
Mobile	0	2	0	1	0	1	0	0	0	0	34
Montgomery	0	1	1	0			0	0		0	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	0	0	0			0	0		1	
Little Rock	2	3	1	0	0	1	0	0	0	0	
Louisiana:											
New Orleans	8	20	0	14	0	13	2	1	0	2	178
Shreveport	1	1	0	3	0	2	0	2	1	1	36
Oklahoma:											
Muskogee	0	0	2	1	0	0	0	0	0	0	
Texas:											
Dallas	5	0	4	2	0	4	0	0	0	13	66
Fort Worth	2	4	3	6	0	1	0	1	0	0	46
Galveston	0	0	0	0	0	2	0	0	0	0	14
Houston	3	3	2	9	0	6	0	0	0	2	50
San Antonio	2	3	0	0	0	6	1	0	0	0	65

City reports for week ended March 21, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases, reported	Cases, estimated expectancy	Cases, reported	Deaths, reported		Cases, estimated expectancy	Cases, reported	Deaths, reported		
MOUNTAIN											
Montana:											
Billings	1	1	0	0	0	0	0	0	0	0	10
Great Falls	3	1	1	0	0	1	0	0	0	15	14
Helena	0	2	0	0	0	0	0	0	0	0	8
Missoula	0	0	0	0	0	0	0	0	0	0	8
Idaho:											
Boise	1	0	0	0	0	0	0	0	0	2	14
Colorado											
Denver	15	29	1	0	0	6	0	0	0	30	79
Pueblo	1	------	0	------	------	------	0	------	------	------	------
New Mexico:											
Albuquerque	1	0	0	0	0	7	0	0	0	7	10
Arizona:											
Phoenix	0	3	1	0	0	4	0	0	0	4	14
Utah:											
Salt Lake City	4	1	1	1	0	2	0	0	0	38	39
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	3
PACIFIC											
Washington:											
Seattle	11	8	2	1	------	------	1	2	------	39	------
Spokane	8	2	8	11	------	------	0	0	------	0	------
Tacoma	3	5	4	2	0	1	0	0	0	0	33
Oregon:											
Portland	6	1	15	16	0	7	1	1	0	0	91
Salem	1	0	1	0	0	0	0	0	0	0	------
California:											
Los Angeles	42	34	3	8	0	28	1	0	0	28	274
Sacramento	3	3	1	0	0	2	0	2	1	46	------
San Francisco	28	4	1	0	0	9	1	0	0	52	165

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Massachusetts:									
Boston	0	0	1	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
New York	16	6	2	2	0	0	1	0	0
Rochester	0	1	0	0	0	0	0	0	0
New Jersey:									
Newark	2	0	2	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	7	2	0	0	0	0	0	0	0
Pittsburgh	4	0	0	0	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cleveland	2	0	0	1	0	0	0	0	0
Columbus	0	0	0	0	0	0	0	1	1
Indiana:									
Indianapolis	1	0	0	0	0	0	0	0	0
Terre Haute	0	1	0	0	0	0	0	0	0

City reports for week ended March 21, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL—continued									
Illinois:									
Chicago	8	4	0	0	0	0	0	1	0
Springfield	1	0	0	0	0	0	0	0	0
Michigan:									
Detroit	2	1	0	0	0	0	0	0	0
Wisconsin:									
Milwaukee	1	1	0	0	0	0	0	0	1
Superior	1	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
St. Paul	1	0	0	0	0	0	0	0	0
Iowa									
Waterloo	2	1	0	0	0	0	0	0	0
Missouri.									
Kansas City	2	2	0	0	0	0	0	0	0
St. Louis	8	3	0	0	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	1	1	0	0	0	0	0	1
Cumberland	1	1	0	0	0	0	0	0	0
District of Columbia:									
Washington	5	2	0	0	0	0	0	0	0
North Carolina:									
Winston-Salem	0	0	0	0	1	0	0	0	0
South Carolina:									
Charleston	0	0	1	0	4	0	0	0	0
Columbia	1	1	0	0	0	0	0	0	0
Georgia									
Atlanta	1	1	0	0	0	0	0	1	1
Savannah	0	0	0	0	2	0	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Nashville	1	0	0	0	0	0	0	0	0
Alabama									
Birmingham	9	4	0	0	0	0	0	1	0
Mobile	1	0	1	1	0	1	0	0	0
Montgomery	0	0	0	0	2	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	5	3	0	0	1	1	0	0	0
Texas:									
Dallas	1	1	0	0	0	2	0	0	0
Forth Worth	0	0	0	0	0	1	0	0	0
MOUNTAIN									
Utah:									
Salt Lake City	1	2	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Tacoma	1	0	0	0	0	0	0	0	0
California:									
Los Angeles	1	2	0	0	0	0	0	0	0
Sacramento	1	2	0	0	0	0	0	0	0
San Francisco	0	0	1	0	0	0	0	0	0

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended March 21, 1931, compared with those for a like period ended March 22, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities February 15 to March 21, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Feb. 21, 1931	Feb. 22, 1930	Feb. 28, 1931	Mar. 1, 1930	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930
98 cities	68	91	70	104	73	88	[2] 66	101	[3] 65	97
New England	70	109	89	121	106	92	79	92	67	65
Middle Atlantic	64	83	56	103	61	85	67	94	64	97
East North Central	66	101	78	122	75	94	[4] 78	134	[5] 73	132
West North Central	59	95	55	120	71	118	63	110	73	74
South Atlantic	47	120	77	96	93	78	53	104	73	90
East South Central	58	96	58	54	29	36	35	24	[6] 8	36
West South Central	186	80	132	101	118	143	[7] 66	111	71	136
Mountain	35	70	87	35	61	88	[8] 29	26	[8] 19	88
Pacific	59	53	57	63	63	38	55	63	51	45

MEASLES CASE RATES

	Feb. 21, 1931	Feb. 22, 1930	Feb. 28, 1931	Mar. 1, 1930	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930
98 cities	668	446	703	538	769	620	[2] 913	646	[3] 1,027	776
New England	541	418	635	506	909	593	1,346	743	1,527	1,030
Middle Atlantic	652	254	645	346	874	417	1,026	396	1,158	539
East North Central	255	267	300	345	369	412	[4] 419	471	[5] 566	538
West North Central	1,086	775	874	939	643	938	595	781	492	994
South Atlantic	2,202	441	2,800	148	2,238	535	2,753	481	3,442	617
East South Central	1,123	604	1,042	753	1,036	717	1,146	634	[6] 1,078	1,291
West South Central	24	745	24	704	68	505	[7] 33	617	51	547
Mountain	1,567	767	1,209	1,507	1,332	2,106	[8] 333	2,449	[8] 219	2,890
Pacific	243	1,271	223	1,636	347	1,581	356	1,881	394	1,800

SCARLET FEVER CASE RATES

	Feb. 21, 1931	Feb. 22, 1930	Feb. 28, 1931	Mar. 1, 1930	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930
98 cities	346	294	373	357	345	321	[2] 376	337	[3] 385	316
New England	589	409	606	402	527	431	589	426	676	872
Middle Atlantic	342	242	381	308	359	283	389	327	392	294
East North Central	353	421	364	510	346	448	[4] 395	461	[5] 400	418
West North Central	497	327	509	341	492	345	518	308	589	335
South Atlantic	304	236	363	258	354	206	810	210	342	286
East South Central	529	149	553	173	401	173	477	96	[6] 231	179
West South Central	139	94	125	108	71	139	[7] 99	167	101	108
Mountain	296	308	305	388	305	300	[8] 428	379	[8] 823	353
Pacific	94	202	145	352	121	241	96	229	110	203

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1931, and 1930, respectively.
[2] Cleveland, Ohio, Springfield, Ill., Dallas, Tex., and Pueblo, Colo., not included.
[3] South Bend, Ind., Memphis, Tenn., and Pueblo, Colo., not included.
[4] Cleveland, Ohio, and Springfield, Ill., not included.
[5] South Bend, Ind., not included.
[6] Memphis, Tenn., not included.
[7] Dallas, Tex., not included.
[8] Pueblo, Colo., not included.

Summary of weekly reports from cities February 15 to March 21, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued.

SMALLPOX CASE RATES

	Week ended—									
	Feb. 21, 1931	Feb. 22, 1930	Feb. 28, 1931	Mar. 1, 1930	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930
98 cities	20	24	20	30	13	25	[2] 20	25	[3] 21	24
New England	0	0	0	0	0	2	0	0	0	0
Middle Atlantic	3	0	0	0	0	0	0	0	0	0
East North Central	13	20	11	40	15	24	[4] 10	30	[5] 8	20
West North Central	128	93	128	91	57	79	132	70	130	97
South Atlantic	2	2	0	2	0	2	0	4	0	2
East South Central	17	12	23	6	23	18	0	24	[6] 8	6
West South Central	51	52	64	111	47	63	[7] 74	24	95	49
Mountain	44	18	9	26	17	9	[8] 19	9	[8] 10	35
Pacific	22	101	39	87	12	105	41	115	43	103

TYPHOID FEVER CASE RATES

	Feb. 21, 1931	Feb. 22, 1930	Feb. 28, 1931	Mar. 1, 1930	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930
98 cities	4	5	7	8	4	8	[2] 3	6	[3] 4	8
New England	0	5	5	0	5	2	0	5	2	0
Middle Atlantic	3	6	6	4	3	4	2	5	2	6
East North Central	0	1	3	1	1	3	[4] 1	1	[5] 2	1
West North Central	4	2	11	6	11	8	0	4	8	10
South Atlantic	10	14	22	60	12	40	6	12	16	14
East South Central	0	6	6	20	17	12	17	24	[6] 0	84
West South Central	7	3	14	0	0	31	[7] 16	7	10	10
Mountain	9	9	0	0	0	0	[8] 0	53	[8] 0	18
Pacific	12	10	4	6	2	6	4	10	8	10

INFLUENZA DEATH RATES

	Feb. 21, 1931	Feb. 22, 1930	Feb. 28, 1931	Mar. 1, 1930	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930
91 cities	60	19	50	19	44	16	[2] 34	13	[3] 31	15
New England	43	17	24	12	19	19	36	2	19	2
Middle Atlantic	42	15	40	16	32	13	23	11	23	14
East North Central	61	16	61	16	48	12	[4] 27	9	[5] 28	9
West North Central	68	12	74	15	59	3	50	6	47	12
South Atlantic	122	22	79	28	73	36	57	18	49	28
East South Central	139	71	76	52	139	58	101	84	[6] 130	78
West South Central	97	68	45	64	52	32	[7] 55	43	35	25
Mountain	61	26	17	18	44	35	[8] 29	18	[8] 38	62
Pacific	26	2	41	10	34	2	36	2	34	7

PNEUMONIA DEATH RATES

	Feb. 21, 1931	Feb. 22, 1930	Feb. 28, 1931	Mar. 1, 1930	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930
91 cities	217	177	212	193	194	166	[2] 189	155	[3] 184	161
New England	276	242	236	232	185	220	147	169	183	218
Middle Atlantic	236	190	217	219	229	181	214	178	216	159
East North Central	187	151	193	179	160	141	[4] 130	127	[5] 132	148
West North Central	147	153	218	138	218	129	159	144	215	123
South Atlantic	340	222	312	236	265	222	332	196	269	222
East South Central	265	239	271	175	227	214	240	233	[6] 222	188
West South Central	228	174	221	185	148	160	[7] 211	142	180	199
Mountain	200	247	191	247	131	150	[8] 209	123	[8] 124	194
Pacific	70	67	91	62	101	75	125	65	101	77

[2] Cleveland, Ohio; Springfield, Ill.; Dallas, Tex.; and Pueblo, Colo., not included.
[3] South Bend, Ind.; Memphis, Tenn.; and Pueblo, Colo., not included.
[4] Cleveland, Ohio, and Springfield, Ill., not included.
[5] South Bend, Ind., not included.
[6] Memphis, Tenn., not included.
[7] Dallas, Tex., not included.
[8] Pueblo, Colo., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended March 21, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended March 21, 1931, as follows:

Province	Cerebrospinal fever	Dysentery	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]							
Nova Scotia	1		19		1		
New Brunswick				1			
Quebec	1		13				8
Ontario			5			3	7
Manitoba	1						
Saskatchewan					1	10	
Alberta [1]							
British Columbia		1					2
Total	3	1	37	1	2	13	17

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended March 31, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended March 21, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Mumps	37
Chicken pox	85	Paratyphoid fever	1
Diphtheria	25	Scarlet fever	58
Erysipelas	3	Tuberculosis	78
German measles	4	Typhoid fever	7
Influenza	13	Whooping cough	24
Measles	166		

CZECHOSLOVAKIA

Communicable diseases—January, 1931.—During the month of January, 1931, certain communicable diseases were reported in the Republic of Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	4	1	Puerperal fever	54	23
Cerebrospinal meningitis	14	5	Scarlet fever	1,312	34
Diphtheria	2,005	123	Trachoma	152	
Dysentery	10	2	Typhoid fever	443	43
Malaria	2		Typhus fever	60	2
Paratyphoid fever	10				

GREAT BRITAIN

England and Wales—Vital statistics—Year 1930.—Births, deaths, and marriages registered in England and Wales during the year 1930 are given in the following table. The figures are provisional.

	Number	Rate [1]
Births	649,430	16.3
Stillbirths	27,507	.69
Deaths	455,397	11.4
Deaths under 1 year	38,790	60
Marriages	314,698	

[1] Rates are per 1,000 total population except for deaths under 1 year of age, which are per 1,000 live births.

The following table gives the death rates from certain causes in England and Wales for the year 1930:

Cause	Death rate per 1,000 population	Cause	Death rate per 1,000 population
Diarrhea and enteritis (under 2 years)	[1] 6.0	Scarlet fever	0.02
Diphtheria	.09	Whooping cough	.05
Influenza	.12	Violence	.55
Measles	.10		

[1] The death rate for diarrhea and enteritis is computed per 1,000 live births.

Scotland—Vital statistics—Year 1930.—Births, deaths, and marriages were registered in Scotland during the year 1930 as follows:

	Number	Rate per 1,000 population
Births	94,538	19.3
Deaths	64,283	13.2
Deaths under 1 year	7,851	[1] 83
Marriages	33,323	

[1] The death rate of infants under 1 year of age is computed per 1,000 births.

Deaths from certain diseases were reported in Scotland for the year 1930 as follows:

Disease	Number of deaths	Disease	Number of deaths
Apoplexy	6,483	Nephritis	1,954
Appendicitis	476	Pneumonia (all forms)	5,681
Bronchitis	3,777	Puerperal sepsis	221
Cerebrospinal meningitis	216	Scarlet fever	127
Diarrhea and enteritis (under 2 years)	604	Smallpox	2
Diphtheria	460	Tuberculosis, respiratory	3,024
Heart disease	8,914	Tuberculosis, other forms	1,261
Influenza	696	Typhoid fever	24
Lethargic encephalitis	122	Typhus fever	1
Malignant tumors	7,120	Whooping cough	628
Measles	792		

TRIPOLITANIA

Plague.—According to information dated March 7, 1931, two mild cases of bubonic plague were discovered among natives in the locality of Retset Dermani, Tripoli, on January 31, 1931. Later a third case occurred. These cases, it was said, originated at Stebu Gherbo, Tunisia, a barley station halfway between Pisidia and El Hassa. Contacts had been isolated, antiplague vaccinations made, and prophylactic measures instituted. No further cases had been reported.

YUGOSLAVIA

Communicable diseases—February, 1931.—During the month of February, 1931, certain communicable diseases were reported in Yugoslavia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	35	6	Poliomyelitis	2	1
Cerebrospinal meningitis	11	6	Puerperal septicemia	3	1
Diphtheria and croup	633	96	Rabies	1	1
Dysentery	23	2	Scarlet fever	533	80
Erysipelas	151	6	Tetanus	[illegible]	10
Lethargic encephalitis	4	1	Typhoid fever	134	20
Measles	936	21	Typhus fever	12	-------

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Sept 21-Oct 18, 1930	Oct 19-Nov 15, 1930	Nov 16-Dec 13, 1930	Dec 14, 1930-Jan 10, 1931	Week ended— January, 1931			February, 1931				March, 1931			
						17	24	31	7	14	21	28	7	14	21	28
Ceylon: Colombo	C													1		
China.																
Canton	C	1	1													
Shanghai	C	38	2													
	D	4														
India	C	39,529	18,941	11,112	10,687	3,504	4,022									
	D	17,635	9,782	5,933	5,689	1,770	2,165									
Bombay	C	16	19	13		20	1									
	D	11	17	7		6	3									
Calcutta	C	24	33	22	28	36	29	24	32	27	33	45	65	80		
	D	15	16	16	20	25	19	19	23	22	25	26	39	49		
Karikal	C				1					4		1	4			
	D									4			4			
Madras	C	2	1		201	47	36	16		18	20	19	6			
	D	2			67	21	11	7	8	5	4	14		5		
Negapatam	D							1	2	1		2				
Rangoon	C	1			1											
	D	1			1	1										
Tuticorin	C	1	1	5	1	1					1					
	D	1	1													
India (French):																
Chandernagor	C	3	1	1	2			1			1					
	D	1			3			1			1					
Pondicherry	C	1	1	4	31	9	4	3	3	10	20	31	39	29		
	D	1		4	21	3	3	3	2	10	9	6	9	6		
India (Portuguese)	C		11		1											
	D		9													
Indo-China (see also table below):																
Pnompenh	C	2	1	2			1	2	1		3	3	3			
	D			2				2			1	2	2			
Saigon and Cholon	C	2	1	3	9	4	1		1			3	1	1		
	D			1	4	2	1					3	1	2		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931: 17	January, 1931: 24	January, 1931: 31	February, 1931: 7	February, 1931: 14	February, 1931: 21	February, 1931: 28	March, 1931: 7	March, 1931: 14	March, 1931: 21	March, 1931: 28
Philippine Islands: [1]																
Ports—																
Iloilo	C	1		1	1			2								
	D	4		3	1			2								
Manila	C	5														
	D	1														
Provinces—																
Antique	C	40														
	D	18														
Bulacan	C	2														
	D	1														
Capiz	C							3	56	69	54	28	35	29	11	4
	D							2	45	55	39	23	29	24	10	4
Iloilo	C	50	30	45	28	11	41	36	57	27	42	10	16	2	5	
	D	40	23	27	22	9	27	25	49	21	22	11	11	2	2	
Masbate	C													21		
	D													9		
Negros, Occidental	C	28	56	163	120	19	32	33	6	1	1	2				
	D	20	41	123	97	15	17	19	5	1	1	2				
Negros, Oriental	C								1							
	D								1							
Samar	C	7	16	8	17											
	D	7	12	8	9											
Sorsogon	C		5													
	D		4													
Surigao	C	(2)														
Siam	C	4	4	6	6	2		1			1					
	D	1	4	6	6	1										
Bangkok	C	3	3	4	6	2		1		1			1			
	D	2	2	4	5	1							1			

Place		August, 1930	September, 1930	October, 1930	November, 1930			December, 1930			January, 1931			February, 1931	
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20
Indo-China (French) (see also table above):															
Annam [3]	C	3													
Cambodia [3]	C	59	38	22	8	1	17	28				19	36		35
Cochin-China [3]	C	27	33	28	5	5	3	8				4	13		5

PLAGUE

Place		Sept. 21-Oct. 18, 1930	Oct. 19-Nov. 15, 1930	Nov. 16-Dec. 13, 1930	Week ended— December, 1930		January, 1931					February, 1931				March, 1931			
					20	27	3	10	17	24	31	7	14	21	28	7	14	21	28
Algeria:																			
Algiers	C	6	11	2	1				1		1		1						
	D		3																
Bone	C										1								
Constantine, vicinity of	C		1			3	1	46			1		1						
	D										1								
Oran	C	10	2																
	D	3	1																
Plague-infected rats		6	1																
Philippeville	C	3	2					1											
	D	1						1											
Argentina:																			
Cordoba Province	C									1				2					
Entre Rios Province—Diamante	C														2				
Jujuy Province—Palpala	C										1			1					
Santa Fe	C													2					
Belgian Congo	C		1	1															
	D		1	1															

[1] Figures for cholera in the Philippine Islands are subject to correction.
[2] During the period from Aug. 24 to Sept. 26, 1930, 28 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, P. I.
[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Week ended— December, 1930		January, 1931					February, 1931				March, 1931			
					20	27	3	10	17	24	31	7	14	21	28	7	14	21	28
British East Africa (see also table below):																			
Tanganyika	C			3	2										15	7			
	D			3	2										4				
Uganda	C	165	171	111	18	17	14	18	7	8	2	8	6						
	D	164	168	112	18	17	14	18	6	8	2	8	6						
Ceylon: Colombo	C	3	1	9	4		4	1	1	1	1	5	6	2	1	2	1		
	D	3	1	8	4		4	1		1	1	4	7	2	1	3	1		
Plague-infected rats			1	2							1	1	1	1	1				
China:																			
Manchuria—Tungliau and Nungan	C	1																	
Shensi	C		1																
Dutch East Indies:																			
Batavia and West Java	C	107	143	208	54	56	66	63	56	57	37	30							
	D	103	146	206	54	57	66	61	54	53	37	24							
Java and Madura	D	335	501	557	159	143	173	140	142	102	98	85	89	100					
Egypt:																			
Alexandria	C	9	7	4	1	1		1				1				1			
	D	6	7	1															
Plague-infected rats				3	1					1				1					
Assiout	C		3	9	5	1		1	2	19	2	3	9		17	15	6	10	1
	D		1	1				1	2	2	2		4		3	4		4	1
Aswan	C			3															
Beni-Suef	C								1										
Dairout	C									19	2								
	D									2	2								
Gharbieh	C										1								
	D										1								
Girga	C				3	1	3					1						14	37
	D					1	1					1						2	5
Kena	C																		5
	D																		2
Manfalut	C							23	5	21	4		11		2	2	3	5	9
	D							5	2	3	1		4		1			2	1
Minieh	C			1						1	1							2	1
	D										1							1	1
Port Said	C		2																

France: Marseille	C	4	4																
Greece (see also table below): Pyrgos	C	2																	
India	C	2,371	2,721	3,270	987	794	841	1,118	1,169	1,279									
	D	1,068	1,497	1,856	548	476	382	620	837	737									
Bassein	C		1					2	1		1	2				1			
	D							1	1			2	1						
Bombay	C	2	1							1			1				1		
	D	2	1							1			1						
Plague-infected rats		64	30	32	19	9	6	13	10	6	9	9	14		8	10	17		
Madras Presidency	C	196	185	148	30	94	96		73	99	75	65							
	D	110	124	78	14	71	69		47	53	39	43							
Rangoon	C	2	2			1	1			2									
	D	2	1			1				1									
Plague-infected rats		1	1	4	1	1			2	1	1			8					
India (Portuguese)	C		3																
	D		3																
Indo-China (see also table below):																			
Pnompenh	C	2		6	1				1	3	2	1				1			
	D	3	1	6	1				1	3	2	1		1	2	1		2	
Saigon and Cholon	C	1																	
Iraq. Baghdad	C	1	P	4						2	3				1	2	1	3	3
	D	1		2						2	2					2		3	1
Madagascar (see also table below): Tamatave	C	1	5	4		2													
	D	1	3	3															
Morocco	C		5		9		10		13										
	D				4		4		4										
Nigeria: Lagos	C	5	38	9	2	1	1	1				1							
	D	5	5	9	2	1	1	1				1							
Plague-infected rats		11	13	5	4		1												
Peru (see table below).																			
Senegal (see table below).																			
Siam	C	1	6									4	5			1			
	D		5									2	4						
Bangkok	C		1	1		1	2			4	4			2	3		29		
	D		1	1		1	2			4	3	1		1	4		6		
Nagara Rajsima	C	1	1	11	4	3	4	6	3	2	1	3	7						
	D	1	1	9	3	3	1	3	2	3	1	4	6						
Syria: Beirut	C		6					1				1		1					
Tripolitania	C		1	13					2	2	1	3		1			1		
	D			1					2			1							
Tunisia: Tunis	C		1	P	12			1	1					9	2	3			
	D													7					
Union of Socialist Soviet Republics																			
Gouranduz	D										28								
Transcaucasia—Karabakh	C									6									
Union of South Africa.																			
Cape Province	C		1	P															
Orange Free State	C						2					P	P						
	D						2												
On vessel: S. S. Marionga de Thermiotis at Avonmouth	C					1													

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931
British East Africa (see also table above):							
Kenya	C	87	53	58	62	50	69
Greece (see also table above)	C			2			
Indo-China (see also table above)	C	2	5	2	5	1	
Madagascar (see also table above):							
Ambositra Province	C			4	44	95	
	D			4	44	87	
Antisirabe Province	C	11	21	3	18	27	
	D	11	21	3	18	26	
Miarinarivo Province	C	2	7	18	12	18	
	D	2	7	18	12	18	
Moramanga Province	C	27	18	20	19	13	
	D	27	17	20	19	11	
Tananarive Province	C	39	79	125	170	178	
	D	38	79	116	164	172	
Peru	C	21	10	42	34	8	
	D	8	2	20	14		
Senegal:							
Baol [1]	C	79	48	53			
	D	20	23	35	4		
Dakar [1]	C	108	3				
	D	90	8				
Louga [1]	C	75	61	37	10		
	D	33	30	25	3		
Thies [1]	C	34	12	24	27	2	
	D	20	4	15	23	1	
Tivaouane [1]	C	110	20	53	31	2	
	D	54	14	31	25	1	

SMALLPOX

Place		Sept 21-Oct. 18, 1930	Oct 19-Nov. 15, 1930	Nov. 16-Dec 13, 1930	Week ended— December, 1930		January, 1931					February, 1931				March, 1931		
					20	27	3	10	17	24	31	7	14	21	28	7	14	21
Algeria:																		
Algiers	C				1							1		1				
Bone	C										1							
Constantine	C		1															
Oran	C			3														
Arabia: Aden	C											1	1					
Belgium	C												1					
Brazil:																		
Porto Alegre (alastrim)	C	26	28	36						3								
Rio de Janeiro	C		2															

British East Africa (see also table below): Tanganyika	C	95	17	385	23	1	57	3	21	25	18	6		42				
	D	6	1	36	1		3		1	1	2	1		12				
British South Africa: Southern Rhodesia	C	153	95	18				18	2	1								
	D			3														
Canada:																		
Alberta	C	22		1			19			7			1					
British Columbia—Vancouver	C	2	3	1			1	2				2	1	2	5			
Manitoba	C										1				1			
Winnipeg	C							1							1			
Nova Scotia	C										1							
Ontario	C	19	59	23	1		8	8	10	3	32	4	10	4	7	8		
Kingston	C					2	4		1					1				
North Bay	C					1		1					1					
Ottawa	C		37	12			2		1	1	1			1				
Sault Ste. Marie	C							1	11	8	5	6			2			
Toronto	C			4													1	
Quebec	C			2						2								
Saskatchewan	C	3	2	18					7	6	5	20	17	18	18	10		
China																		
Canton	C												2			1	1	
Chungking	C	P	P	P	2													
Foochow	C	P	P	P				P		P		P		P				
Hong Kong	C					1				1			2	5		2		
Manchuria—	D												1	1	1			
Harbin	C		1								1							
Kwantung—Dairen	C			4		1												
	D			1														
Nanking	C	P	P	P	P	P	P	P	P		P	P	P	P	P			
Shanghai—																		
Foreigners only	C	1	2	8	4	2	6	2	1	1	6	4	4	7	2			
Including natives	D		1	4	5	1	1	4	2	4	4	3	5	2	4	3	5	
Swatow	D	4	3	3		2	1	2	1	1	3	2		3	3	7		
Tientsin	C	1	1	2					1									
Chosen (see table below)																		
Colombia: Cali	D	2		1														
Dutch East Indies																		
Java—Batavia and West Java	C	14	26	6	2		2			28		1					1	
	D	4	4	2		1	1			1		1						
Sanggi Islands	C		29															
France (see table below).	D		3															
Great Britain:																		
England and Wales	C	325	372	508	138	135	164	228	187	272	286	213	221	250	247	227	171	
Bradford	C	1	1	1			1			1		3		1				
Cardiff	C	1																
Leeds	C	1	2				2											
London	C	29	172	154	27	38	48	48	45	47	33	24	23	16	23	36	26	
London and Great Towns	C	52	296	433	105	131	162	162	154	198	194	147	150	186	189	158	117	
	D		1	1										1				
Sheffield	C									1	1	1		16	6	10	2	
Stoke-on-Trent	C		1							1						1		

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec 13, 1930	Week ended— December, 1930		January, 1931					February, 1931				March, 1931		
					20	27	3	10	17	24	31	7	14	21	28	7	14	21
Greece (see table below).																		
Honduras:																		
Amapala	C															1		
Ocotopeque and Gracias districts	C															P		
Puerto Castilla	C							4	7	1		3	3					
India	C	2,322	2,412	3,627	942	1,169	1,278	2,234	2,068	2,396								
	D	572	606	874	262	281	327	510	467	416								
Bombay	C	1		1			1	1	2	2	2	1			3		4	
	D			1			1	1			1				1			
Calcutta	C	12	9	18	10	19	15	15	28	28	40	47	35	51	53	53		
	D	11	7	11	7	13	10	10	16	22	29	33	26	41	66	36		
Cochin	C	12	25	22	6	7		2	5	6	8	10	19		16	24	15	
	D	1	3	4				1					1		1	1		
Karachi	C			3							2	1			4			
	D			1							1	1						
Madras	C	19	9	20		1		3	4	7	3	2	4	1	3	1	6	
	D	8	2	3											1			
Moulmein	C									2								
Negapatam	C	14	9	6														
Rangoon	C	2	1	1									2		1		1	
	D		1														1	
Tuticorin	C	1																
Vizagapatam	C	1										1			8		1	
	D														2			
India (French):																		
Chandernagor	C	3	3			5			3	2	1	3	2		6			
	D	1	1			2	1		1						1			
Karikal	C	1					1	2	1	2		2	2					
	D	1						2		2		2	2					
Pondicherry Province	C	38	11	19	8	8	7	11	16	8	13	8	1	1	10			
	D	36	11	17	7	8	7	10	16	8	13	8	1	1	10			
India (Portuguese)	C				3			1	1									

below):	C	2		1		2						1					1	
	D			1								1						
($	C		2	2					3	1		2		2	2		1	
	D		2	2					2			2			1		3	
	C	2													3	6		
	C	79	6	16				1		2		1		5		5		
	D	27		2										1				
Ivory Coast (see table below).																		
Japan:																		
Kobe	C														1	1		
Taiwan	C											1						
Mexico (see also table below)																		
Jalisco (State)—Guadalajara	D	3	3	3						1								
Juarez	D	1	1															
Mexico City and surrounding territory	C	13	9	6	1	5	4						7	5		11	13	
	D	3	2	6	2	1	3					1	1	3	2	2	5	
Vera Cruz	C		1										1		1	1		1
Morocco (see table below).																		
Nicaragua. Porto Cabezas	C				2													
Panama Canal Zone	C										2							
Poland	C		8	3			23	2						1				
Portugal: Lisbon	C	16	20	37	21	17		34	27	31	15	30		12	19	9	16	
Siam	C	1						1	1		1	1	1	1				
Somaliland, British: Boales	C	1	1	1														
	D	1						1										
Spain	C		51	67	19	31	18				10	8	10	4	10	46		
Straits Settlements	C	5	10	17	3		2	1	3	1	2	1			2			
	D	1	2	7	2		1				1				1			
Sudan (Anglo-Egyptian)	C	82	5	50		47		17	1	7		3	1	1	44	51	3	1
	D	7	1	5		5		1		7					6	4		1
Sudan (French) (see table below).																		
Switzerland Berne Canton	C	1																
Syria (see table below).																		
Tunisia: Tunis	C	2					13	4	6	1	1							
Turkey (see table below).																		
Union of South Africa.																		
Cape Province	C	P	P	P	P	P	P	P				P						
Orange Free State	C		2	P								P						
Transvaal	C	P	P	P	P	P	P		P	P	P	P	P					
Upper Volta	C			6				4						8	10			
	D							2										
On vessel:																		
S. S. Clan Mactoggart at Suez	C												2					
S. S. Muncaster Castle at Manila from Hong Kong	C					1												
S. S. Matheran at Suez from Calcutta	C									1								
S. S. Clan Buchanan at Suez	C														2			

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CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		August, 1930	September, 1930	October, 1930	November, 1930			December, 1930			January, 1931			February, 1931	
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20
Indo-China (see also table above)	C	93	192	258		86		38	9	14		48	46		46
Ivory Coast	C			4		2		9							
Sudan (French)	C	39	P	17				43		96					
	D	3		2				16		4					
Syria: Beirut	C	1										1			

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
British East Africa (see also table above):							
Kenya	C	186		424		653	
Chosen	C	65	35	3	22		
	D	21	15	5	6		
France	C	1					
Greece	C	1	6				4
Mexico (see also table above)	D	659	718	822	893		1
Morocco	C	3	8	4	4	20	
Turkey	C	51	21	19	74		
	D	13	4	2	1		

TYPHUS FEVER

Place		Sept. 21-Oct. 18, 1930	Oct. 19-Nov. 15, 1930	Nov. 16-Dec. 13, 1930	Week ended— December, 1930		January, 1931					February, 1931				March, 1931		
					20	27	3	10	17	24	31	7	14	21	28	7	14	21
	C		1	2									1	1				
...nt	C	2	1	2			3	3		6	6	19			4			
	C	3		5						1	2					1		
	C	6	3	11	3				9	2	1	1		2		3		
	D				1													

	C									2								
(see also table below)	C	1		1						3								
	C									2								
	C			1														
.. below).																		
Alexandria	C	1	2	2														
	D		2															
Beheira Province	C				1													
	D				1													
Cairo	C			1	1							1						
Port Said	C	1	2							1								
Eritrea: Asmara	C																1	
Great Britain: Scotland	C											1						
Glasgow	C										2							
	D										1							
Guatemala.[1]																		
Iraq. Baghdad	C												2	1	1	1	1	
	D												1					
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico (see also table below):																		
Durango	D	2									1							
Mexico City, including municipalities in Federal District	C	8	11	14	5	2	4	1	13	12	6	8	13	13	9		46	
	D	2	4	7	4	1	3	2	8	9	9	8	4	7	5		20	
San Luis Potosi	D			2									2	2		1	1	1
Morocco	C		3	1	8					5	6	2	7	8	5	8	2	
	D	1								2				1				
Palestine	C	3	3	7	1	1		2	1	1			3				2	1
Paraguay: Asuncion	D									2	2							
Poland	C	22	37	42	18	6	28	11	19	21	16	50	49	41	43	56	62	
	D	2		7	3				2	1	4	1	3	3	4	9	4	
Portugal: Oporto	C	2	4	6						1								
Rumania	C	14	41	34	20	24		59	54	43	51	45	49	53				
	D		2	3	1	2		2	1	7	6	2	5	11				
Spain	C	2	4	1														
	D	2		1														
Tunisia	C	12		28						7	4	5			6	12	5	
Turkey (see table below).																		
Union of South Africa.																		
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P					
Municipality of East London	C	1	1	1	P		2	1		1	1	1						
Natal	C	2	P					P	P	P	P	P	P					
Orange Free State	C		P		P	P		P	P	P	P	P	P					
Transvaal	C	P	P	P	P	P	P	P	P	P	P	P	P					
Yugoslavia (see table below).																		

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reports an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths, P, present]

Place		Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931
China: Harbin (see also table above)	C	5		3			
Chosen: Seoul	C	2	1	7	1	1	1
Czechoslovakia	C	1			16	16	60
Greece: Athens	C	6	4	4	4	10	10
Latvia	C	1	2				
Lithuania	C	7	24	1	5	6	26
	D	1	2		1	3	3
Mexico (see also table above)	D	26	47	47			
Turkey	C	11		28	3	2	
Yugoslavia	C	2		2	2		20
	D	1		1			2

YELLOW FEVER

	Cases	Deaths
Brazil:		
Bahia State—Mar. 14, 1931	1	
Ceara State—Mar. 14, 1931	2	
Barbalha, Feb. 7, 1931	1	1
Minas Geraes State, Mar. 20, 1931	2	
Rio de Janeiro State—		
Mar. 7, 1931	1	1
Mar. 21, 1931	1	1
Cambucy—		
Jan. 1-25, 1931	3	3
Feb. 1-7, 1931	1	1
Brazil—Continued.		
Rio de Janeiro State—Continued.		
Friburgo (imported), Jan. 25-30, 1931	1	
Padua—		
Jan. 18-21, 1931	1	1
Feb. 1-7, 1931	1	1
Gold Coast.		
July 10, 1930	1	
Albosso, Aug. 4, 1930		1

×

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UNITED STATES TREASURY DEPARTMENT

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ISSUED WEEKLY

BY THE UNITED STATES PUBLIC HEALTH SERVICE

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SPECIAL ARTICLES

Summary of Current Prevalence of Communicable Diseases
A Serological Study of 235 Strains of Meningococci
Observations on the Assay of the Antineuritic Vitamin

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HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen R. C WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention or control of disease. (3) Other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 46 **APRIL 17, 1931** **NO. 16**

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES[1]

March 1-28, 1931

The prevalence of certain important communicable diseases, as indicated by weekly telegraphic reports from State health departments to the Public Health Service, is summarized in this report. The underlying statistical data are published weekly in the Public Health Reports under the section entitled "Prevalence of Disease."

Influenza.—For the aggregated States included, the reported cases for the 4-week period totaled 25,635, which was very nearly three times last year's figure for the corresponding season. During the preceding period this ratio stood at 3.9, the reported cases having totaled 41,548.

TABLE 1.—*Number of influenza cases reported in different geographic sections by 2-week periods in the winter and spring of 1930–31 and during the corresponding periods in 1929–30*

Region	2-week period ended—										
	Nov. 15, 1930	Nov. 29, 1930	Dec. 13, 1930	Dec. 27, 1930	Jan. 10, 1931	Jan. 24, 1931	Feb. 7, 1931	Feb. 21, 1931	Mar. 7, 1931	Mar. 21, 1931	Apr. 4, 1931
New England and Middle Atlantic.											
1930-31	70	69	67	113	642	3,546	3,396	1,776	748	401	196
1929-30	71	66	127	174	191	158	179	201	199	180	255
South Atlantic.											
1930-31	1,307	1,351	1,529	1,204	2,052	5,090	12,768	13,963	9,948	5,791	4,975
1929-30	1,558	1,451	2,271	1,879	2,832	2,508	2,698	2,510	2,619	2,211	2,143
East North Central											
1930-31	82	112	128	111	148	472	1,237	1,834	2,243	1,609	683
1929-30	82	125	151	182	253	341	202	235	221	251	392
West North Central:											
1930-31	12	27	17	22	58	146	220	525	613	229	176
1929-30	20	45	36	36	87	141	124	94	60	42	44
East and West South Central:											
1930-31	349	422	453	502	991	1,510	2,271	2,879	2,609	2,967	2,771
1929-30	480	697	970	885	1,481	1,447	2,104	1,593	1,157	1,024	993
Mountain and Pacific.											
1930-31	94	114	197	227	242	302	555	1,032	1,454	1,532	888
1929-30	157	174	234	174	301	384	358	329	305	205	157
Total (all regions): [a]											
1930-31	1,914	2,095	2,391	2,269	4,133	11,066	20,447	22,009	17,615	12,529	9,689
1929-30	2,368	2,558	3,789	3,330	5,145	4,979	5,665	4,962	4,561	3,913	3,984

[1] 38 States, New York City, and the District of Columbia included.

[a] From the Office of Statistical Investigations, U. S. Public Health Service. The number of States included for the various diseases are as follows. Typhoid fever 47, poliomyelitis 48, meningococcus meningitis 48, smallpox 48, measles 45, diphtheria 47, scarlet fever 47, influenza 39 States and New York City. The District of Columbia is counted as a State in these reports.

Table 1 shows the number of cases by 2-week periods during recent months in comparison with the experience of last year. From this table it is evident that recovery had advanced farthest in the North Atlantic and North Central regions and that the two southern groups were still high at the end of the period, although there, also, the decline seems to have begun.

Poliomyelitis.—During the period of this report 87 cases of poliomyelitis were reported, which is about 20 per cent higher than the figure for the corresponding period of last year. Most sections of the country seem to be declining from the high rates of last autumn.

Meningococcus meningitis.—For the current period there were reported 682 cases of meningococcus meningitis, about 56 per cent of the figure for the corresponding period of last year. This favorable comparison was characteristic of all regions.

Typhoid fever.—For typhoid fever, also, the recent reports have been favorable. The reported cases totaled 475, or about 65 per cent of last year's figure for the comparable season.

Scarlet fever.—The reported current incidence of scarlet fever, 24,192 cases for the period under report, was about 11 per cent in excess of that for last year. The excess over last year has, during recent months, been apparent in all regions except the Mountain and Pacific and East and West South Central.

Measles.—During the current four weeks 69,621 cases of measles were reported, a figure 31 per cent in excess of last year's level for the period involved. This unfavorable comparison applies mainly to the Atlantic coast and the East North Central groups of States.

Diphtheria.—The low level of diphtheria in relation to past years continues. During the current period 4,036 cases were reported, which is approximately 75 per cent of last year's figure. The only region showing an excess over last year is the West North Central, and even there the excess is only about 5 per cent.

Smallpox.—For smallpox, also, the comparison with last year is favorable. The number of reported cases (3,750) is only 58 per cent of that for the corresponding period last year. All regions show a favorable picture in this regard.

Mortality, all causes.—The mortality from all causes in large cities reporting to the Census Bureau was 13.7 per thousand population, annual basis. Last year the rate was 13.5. During the four preceding years the rates for the corresponding period were 14.8, 14.6, 13.9, and 17.7, respectively. The current mortality, therefore, is relatively low in relation to recent years.

During the preceding four weeks of this year the rate was 14.2.

STUDIES ON MENINGOCOCCI ISOLATED IN THE UNITED STATES, 1928–1930

SEROLOGICAL CLASSIFICATION AND GEOGRAPHIC DISTRIBUTION

By SARA E. BRANHAM, *Bacteriologist*, CLARA E. TAFT, *Assistant Bacteriologist*, and SADIE A. CARLIN, *Laboratory Assistant, United States Public Health Service*

INTRODUCTION

Epidemic cerebrospinal meningitis was more prevalent in the United States during 1928, 1929, and 1930, than it has been at any other time since the World War. The most serious outbreaks have occurred in a scattered fashion and have usually shown no obvious relation to each other epidemiologically, though the general trend of the epidemic has been from the west coast eastward. Although Chicago, Detroit, and Indianapolis are in geographic proximity, the principal outbreaks in these cities were many months apart. The fatality rate throughout these three years has been high—as much as 50 per cent in some places—and serum therapy was not as efficacious in many localities as earlier experience with it had promised. A study of meningococci isolated from meningitis patients during this time has seemed an important step in approaching an understanding of this disappointing situation. We began our studies by trying to determine whether or not there are differences between the meningococci involved in these current cases and those which were prevalent during the epidemics of 10 years ago.

These studies have been made upon 235 strains of meningococci which have been received from a number of sources and through the cooperation of many people. All the strains have been isolated since June, 1928. Two hundred and fifteen are from spinal fluid, 5 from blood, and 15 from the nasopharynx. Table 1 lists these strains with their laboratory numbers, shows the dates on which they were received, the localities from which they were obtained, their source (i. e., whether from spinal fluid, blood, etc.), and their serological type as determined at the National Institute of Health.

TABLE 1.—*A list of the meningococci included in this study, with dates received, sources, and types as determined at the National Institute of Health*

No.	National Institute of Health No.	Time of reception	Locality	Sender	Source	Typing by agglutination	Typing by absorption necessary
1	100	May 21, 1928	New York City	Postgraduate Hospital	Spinal fluid	I	Yes.
2	101	do	do	do	do	III	Yes.
3	102	do	do	do	do	III	Yes.
4	103	March, 1928	Washington, D. C.	Dr. J. W. Lindsay, Children's Hospital.	do	I	Yes.
5	104	Apr. 11, 1928	do	do	do	I	No.

TABLE 1.—*A list of the meningococci included in this study, with dates received, sources, and types as determined at the National Institute of Health*—Continued

No.	National Institute of Health No.	Time of reception	Locality	Sender	Source	Typing by agglutination	Typing by absorption necessary
6	105	Feb. 23, 1928	Newport, R. I	United States Naval Hospital.	Spinal fluid	I	No.
7	106	May 4, 1928	New York City	Postgraduate Hospital.	do	I	No.
8	107	do	do	do	do	I	No.
9	108	do	Cincinnati, Ohio	Dr. H. Amoss, Johns Hopkins.	do	I	No.
10	109	do	Baltimore, Md	Harriet Lane Home.	do	III	Yes.
11	110	May 18, 1928	Washington, D. C	Dr. J. W. Lindsay, Children's Hospital.	do	I	Yes.
12	111	May 16, 1928	New York City	Postgraduate Hospital.	do	I	No.
13	112	June 14, 1928	San Francisco, Calif.	Dr. K. F. Meyer, Hooper Foundation.	do	I	Yes.
14	113	do	do	do	do	I	No.
15	114	do	do	do	do	I	Yes.
16	115	do	do	do	do	I	Yes.
17	116	do	do	do	do	I	Yes.
18	117	June 26, 1928	Detroit, Mich	Parke, Davis & Co.	do	III	Yes.
19	118	do	do	do	do	III	Yes.
20	119	do	do	do	do	III	Yes.
21	120	do	do	do	do	III	Yes.
22	121	do	do	do	do	III	Yes.
23	122	Summer of 1928.	Memphis, Tenn	Dr. A. D. Dulaney	Blood	II	No.
24	124	July 2, 1928	Washington, D. C	Dr. J. W. Lindsay, Childrens' Hospital.	Spinal fluid	I	Yes.
25	125	Aug. 15, 1928	Chicago, Ill	Doctor Tonney, Chicago Department of Health.	Naso-pharynx.	IV	No.
26	126	June 11, 1928	do	do	Spinal fluid	IV	No.
27	127	June 15, 1928	do	do	do	IV	No.
28	128	June 11, 1928	do	do	do	n. sp.[1]	No.
29	129	Aug. 15, 1928	do	do	do	n. sp[1]	No.
30	130	June 11, 1928	do	do	do	I	No.
31	131	do	do	do	do	I	No.
32	132	do	do	do	do	I	No.
33	133	do	do	do	do	I	Yes.
34	134	do	do	do	do	II	Yes.
35	135	do	do	do	do	I	Yes.
36	137	do	do	do	do	I	Yes.
37	138	Aug. 15, 1928	do	do	do	IV	No.
38	139	do	do	do	do	III	Yes.
39	140	do	do	do	do	I	Yes.
40	141	do	do	do	do	III	Yes.
41	142	Nov. 17, 1928	Boston, Mass	Dr. E. Robinson, Massachusetts State Department of Health.	do	I	Yes.
42	143	Oct. 23, 1928	Lawrence, Kans	Dr. Noble Sherwood, University of Kansas	do	I	Yes.
43	144	Oct. 2, 1928	San Francisco, Calif.	Dr. K F. Meyer, Hooper Foundation.	do	I	No.
44	145	Nov. 20, 1928	Detroit, Mich	Parke, Davis & Co	do	I	No.
45	146	do	do	do	do	III	Yes.
46	147	do	do	do	do	III	Yes.
47	148	do	do	do	do	I	Yes.
48	149	June 27, 1927	New York State	Board of health	do	II	No.
49	150	do	New Haven, Conn	New York State Board of Health	do	I	No.
50	151	do	New York State	Board of health	do	I	Yes.
51	152	do	do	do	do	I	No.
52	153	Dec. 29, 1928	Washington, D. C	Dr. J. W. Lindsay, Children's Hospital.	do	III	No.
53	154	Dec. 16, 1928	San Pedro, Calif., U. S. S. Pennsylvania.	Naval Medical School.	do	III	Yes.

[1] This is a pigmented form which has been described as a new species, *Neisseria flavescent*, in a separate report. (Public Health Reports, Vol. 45, No. 16, Apr. 18, 1930, pp. 845–849.)

Table 1.—*A list of the meningococci included in this study, with dates received, sources, and types as determined at the National Institute of Health*—Continued

No.	National Institute of Health No.	Time of reception	Locality	Sender	Source	Typing by agglutination	Typing by absorption necessary
54	155	June 11, 1928	Chicago, Ill	Doctor Tonney, Chicago Department of Health.	Spinal fluid	n. sp.[1]	No.
55	156	do	do	do	do	n. sp.[1]	No.
56	157	Aug. 15, 1928	do	do	do	n. sp.[1]	No.
57	158	do	do	do	do	IV	No.
58	159	do	do	do	do	n. sp.[1]	No.
59	160	do	do	do	do	n. sp.[1]	No.
60	161	Dec 26, 1928	Twin Falls County, Idaho.	Mr Saxon, Southern Idaho Laboratory.	do	I	No.
61	162	do	do	do	do	I	Yes.
62	163	Jan. 28, 1929	do	do	do	I	No.
63	164	do	do	do	do	I	No.
64	165	Feb. 16, 1929	Salt Lake City, Utah.	Utah State Board of Health.	do	I	Yes.
65	166	Feb. 18, 1929	do	do	do	I	Yes.
66	167	Feb. 16, 1929	do	do	do	I	Yes.
67	168	Feb. 18, 1929	do	do	do	I	Yes.
68	169	Oct. 19, 1928	New Orleans, La	Doctor Duvall, Tulane University.	do	III	Yes.
69	170	Dec 27, 1928	Massachusetts	State department of health.	do	I	Yes.
70	171	do	do	do	do	III	No.
71	172	do	do	do	do	I	No.
72	173	Jan. 12, 1929	Detroit, Mich	Dr J. F Norton, Detroit Health Department.	do	II	No.
73	174	do	do	do	do	III	Yes.
74	175	Jan 25, 1929	do	do	do	I	No.
75	176	do	do	do	do	I	No.
76	177	do	do	do	do	I	No.
77	178	do	do	do	do	I	No.
78	179	Jan 12, 1929	do	do	do	I	No.
79	180	do	do	do	do	I	No.
80	181	Feb 16, 1929	do	do	do	I	No.
81	182	do	do	do	do	I	No.
82	183	do	do	do	do	I	No.
83	184	do	do	do	Carrier	I	No.
84	185	Feb. 26, 1929	Salt Lake City, Utah.	Doctor Beatty, State Department of Health, Utah.	(2)	I	Yes.
85	186	do	do	do	(2)	I	Yes.
86	187	do	do	do	(2)	I	Yes.
87	188	February or March, 1929	Washington, D. C	Dr. J W. Lindsay, Children's Hospital.	Spinal fluid	I	No.
88	189	Feb. 16, 1929	Detroit, Mich	Dr J F. Norton, Detroit Health Department.	do	I	Yes.
89	190	Mar. 9, 1929	do	do	do	I	Yes.
90	191	do	do	do	do	III	Yes.
91	192	do	do	do	do	I	Yes
92	193	do	do	do	do	I	Yes.
93	194	do	do	do	do	I	No.
94	195	Mar. 11, 1929	do	do	do	I	Yes.
95	196	do	do	do	do	I	No.
96	197	do	do	do	do	I	No.
97	198	do	do	do	do	I	No.
98	199	do	do	do	do	I	Yes.
99	200	do	do	do	do	III	No.
100	201	do	do	do	do	I	Yes.
101	203	Mar. 18, 1929	Chicago, Ill	Doctor Tonney, Chicago Health Department.	do	III	Yes.
102	204	Mar. 28, 1929	do	do	do	IV	No.
103	205	do	do	do	do	IV	No.
104	206	do	do	do	do	IV	No.
105	207	Mar. 22, 1929	do	do	do	III	Yes.
106	208	do	do	do	do	n. sp.[1]	No.
107	209	do	do	do	do	n. sp.[1]	No.
108	210	Mar. 28, 1929	do	do	do	IV	No.

[1] This is a pigmented form which has been described as a new species, *Neisseria flavescens*, in a separate report. (Public Health Reports, Vol. 45, No. 16, Apr. 18, 1930, pp. 845-849.)
[2] No definite information obtained, but presumably from spinal fluid.

TABLE 1.—*A list of the meningococci included in this study, with dates received, sources, and types as determined at the National Institute of Health*—Continued

No.	National Institute of Health No.	Time of reception	Locality	Sender	Source	Typing by agglutination	Typing by absorption necessary
109	211	Mar. 22, 1929	Chicago, Ill	Doctor Tonney, Chicago Health Department.	Spinal fluid	IV	No.
110	212	Mar 28, 1929	do	do	do	IV	No.
111	213	Mar 22, 1929	do	do	do	IV	No.
112	214	Mar. 28, 1929	do	do	do	I	No.
113	215	do	do	do	do	IV	No.
114	216	do	do	do	do	IV	No.
115	217	Mar. 22 1929	do	do	do	n. sp.[1]	No.
116	218	do	do	do	do	n. sp.[1]	No.
117	219	do	do	do	do	n. sp.[1]	No.
118	220	Mar 28, 1929	do	do	do	IV	No.
119	221	Mar. 22 1929	do	do	do	n. sp.[1]	No.
120	222	Mar 28 1929	do	do	do	IV	No.
121	223	Mar. 22, 1929	do	do	do	n. sp.[1]	No.
122	224	Mar. 28, 1929	do	do	do	I	No.
123	225	Mar. 22 1929	do	do	do	IV	No.
124	226	Mar. 28, 1929	do	do	do	I	Yes.
125	227	do	Detroit, Mich	Parke, Davis & Co.	do	I	No.
126	228	do	do	do	do	III	Yes.
127	229	do	do	do	do	I	No.
128	230	do	do	do	Naso-pharynx of contact.	II	Yes.
129	231	do	do	do	Spinal fluid	III	No.
130	232	do	do	do	do	I	No
131	233	do	do	do	do	I	No.
132	234	do	do	do	do	I	Yes.
133	244	Apr. 27, 1929	Kansas City, Mo	Dr. J. F. Anderson, Squibb & Sons.	do	IV	No.
134	245	Apr. 18, 1929	Baltimore, Md	Dr. Ann G. Kuttner, Harriet Lane Home, Johns Hopkins Hospital.	Blood	II	No.
135	246	Apr. 26, 1929	Massachusetts	Dr. E. S. Robinson, Massachusetts, Department of Health.	Spinal fluid	I	Yes.
136	248	do	do	do	do	I	No.
137	249	May 29, 1929	Rocky Mount, N.C.	Isolated at National Institute of Health	Naso-pharynx	II	Yes.
138	250	do	do	do	do	II	Yes.
139	252	Apr. 29, 1929	Washington, D. C	Doctor Rice, Garfield Hospital.	Spinal fluid	III	Yes.
140	253	May 13, 1929	San Francisco, Calif	Senior Surgeon J. C. Perry, San Francisco.	Brain at post-mortem.	III	No.
141	254	do	do	do	Naso-pharynx of carrier.	III	No.
142	255	do	do	do	do	III	No.
143	256	June 12, 1929	do	do	do	III	Yes.
144	257	June 14, 1929	do	do	do	III	Yes.
145	258	do	do	do	do	III	Yes.
146	259	July 15, 1929	Massachusetts	Dr. E. S. Robinson, Massachusetts Health Department.	Spinal fluid	I	No.
147	260	July 30, 1929	do	do	Blood	I	No.
148	261	Sept. 13, 1929	Washington, D. C	Dr. J. W. Lindsay, Garfield Hospital.	Spinal fluid	II	No.
149	268	Sept. 18, 1929	do	do	do	I	No.
150	270	Nov. 14, 1929	Baltimore, Md	Johns Hopkins Hospital.	do	I	No.
151	271	Nov. 23, 1929	Cleveland, Ohio	Dr. E. E. Ecker, Western Reserve University.	do	III	No.
152	277	Jan. 26, 1930	do	do	do	III	No.
153	279	Feb. 19, 1930	New Haven, Conn	Mr. E. F. Voigt, Lederle Antitoxin Laboratory.	do	III	No.

[1] This is a pigmented form which has been described as a new species, *Neisseria flavescens*, in a separate report. (Public Health Reports, Vol. 45, No. 16, Apr. 18, 1930, pp. 845-849.)

Table 1.—*A list of the meningococci included in this study, with dates received, sources, and types as determined at the National Institute of Health*—Continued

No.	National Institute of Health No.	Time of reception	Locality	Sender	Source	Typing by agglutination	Typing by absorption necessary
154	280	Feb. 19, 1930	New Haven, Conn.	Mr E. F. Voigt, Lederle Antitoxin Laboratory.	Spinal fluid	III	No.
155	283	Feb. 24, 1930	Indianapolis, Ind.	Mr. Jamieson, Eli Lilly & Co.	do	III	Yes.
156	284	do	do	do	do	III	No.
157	285	do	do	do	do	III	No.
158	288	do	do	do	do	III	No.
159	290	do	do	do	do	III	No.
160	291	do	do	do	do	III	No.
161	292	do	do	do	do	III	No.
162	293	do	do	do	do	III	No.
163	302	March, 1930	do	do	do	III	No.
164	304	do	do	do	do	I	Yes.
165	305	do	do	do	do	III	Yes.
166	306	do	do	do	do	I	No.
167	307	do	do	do	do	I	Yes.
168	308	do	do	do	do	III	No.
169	309	do	do	do	do	III	No.
170	313	Apr. 10, 1930	do	do	do	III	No.
171	316	May 1, 1930	Memphis, Tenn.	Dr. A. D. Dulaney, University of Tennessee.	do	I	Yes.
172	318	do	do	do	do	III	No.
173	321	do	do	do	do	I	Yes.
174	323	do	do	do	do	III	No.
175	324	do	do	do	do	I	No.
176	325	do	do	do	do	I	No.
177	326	do	do	do	do	III	No.
178	327	do	do	do	do	I	No.
179	328	do	do	do	do	I	No.
180	330	do	do	do	do	I	No.
181	331	do	do	do	do	I	No.
182	332	do	do	do	do	I	No.
183	334	do	do	do	do	I	No.
184	335	do	do	do	do	I	No.
185	336	do	do	do	do	III	No.
186	337	do	do	do	do	III	No.
187	338	do	do	do	do	III	No.
188	339	do	do	do	do	III	No.
189	340	do	do	do	do	I	No.
190	341	do	do	do	do	III	No.
191	342	do	do	do	do	I	No.
192	343	do	do	do	do	I	Yes.
193	345	do	do	do	do	III	No.
194	347	do	do	do	do	I	No.
195	348	do	do	do	do	I	No.
196	350	do	do	do	do	I	No.
197	351	do	do	do	do	I	No.
198	352	do	do	do	do	I	No.
199	353	do	do	do	do	I	No.
200	354	do	do	do	do	III	No.
201	355	do	do	do	do	III	No.
202	356	do	do	do	do	III	No.
203	357	do	do	do	do	III	No.
204	358	do	do	do	do	III	No.
205	359	do	do	do	do	I	No.
206	361	do	do	do	do	I	No.
207	362	do	do	do	do	I	No.
208	364	do	do	do	do	I	No.
209	365	do	do	do	do	III	No.
210	366	do	do	do	do	III	No.
211	369	do	do	do	do	I	No.
212	370	do	do	do	do	III	No.
213	371	do	do	do	do	I	No.
214	372	do	do	do	do	I	No.
215	373	do	do	do	do	I	No.
216	374	do	do	do	do	I	No.
217	375	do	do	do	do	I	No.
218	376	do	do	do	do	III	No.
219	378	do	do	do	do	III	No.
220	379	do	do	do	do	I	Yes.
221	382	June 9, 1930	New Orleans, La.	Miss D. M. Douglas, Tulane University.	Blood	III	No.
222	383	do	do	do	(1)	II	No.

1 No definite information obtained, but presumably from spinal fluid.

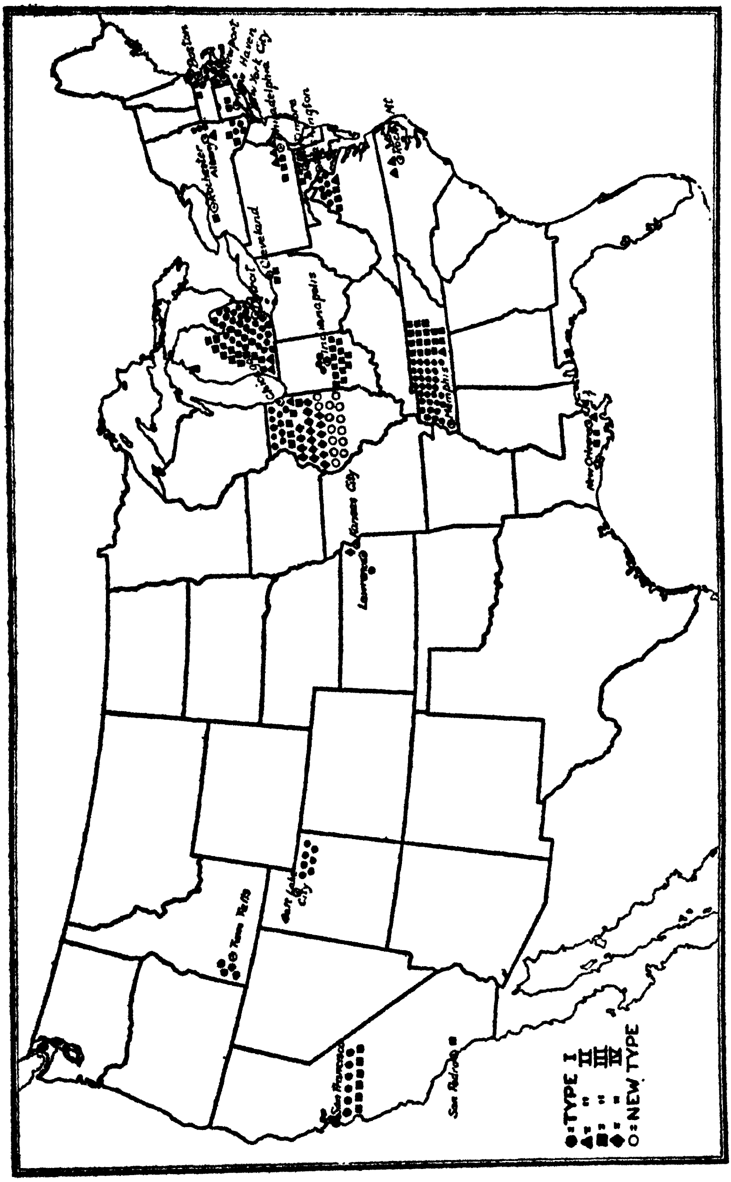
TABLE 1.—*A list of the meningococci included in this study, with dates received, sources, and types as determined at the National Institute of Health*—Continued

No.	National Institute of Health No.	Time of reception	Locality	Sender	Source	Typing by agglutination	Typing by absorption necessary
223	384	June 27, 1930	Detroit, Mich	Parke, Davis & Co.	Spinal fluid	I	No.
224	385	do	do	do	do	I	No.
225	386	do	do	do	do	I	No.
226	387	do	do	do	Blood	III	No.
227	388	do	do	do	Spinal fluid	III	No.
228	389	do	do	do	Naso-pharynx	I	Yes.
229	391	Sept. 17, 1930	Philadelphia, Pa	Dr. J. Zozaya, Mulford Biological Laboratory, Glenolden, Pa.	do	III	Yes.
230	392	do	do	do	do	II	Yes.
231	393	do	do	do	do	II	Yes.
232	394	do	do	do	do	II	Yes.
233	396	Nov. 1, 1930	Washington, D. C.	Isolated at National Institute of Health.	Spinal fluid	III	No.
234	402	Dec. 15, 1930	do	do	do	I	No.
235	403	Jan. 2, 1931	Rochester, N. Y.	Dr. J. A. Kennedy, Strong Memorial Hospital.	do	III	No.

These meningococci have been studied from many angles, but in this paper only their serological relationships, based on the agglutination and the absorption of agglutinin tests, will be discussed, because it is upon this basis that serum therapy in cerebrospinal meningitis depends in the United States at the present time.

Although meningococci are a homogeneous group morphologically and culturally, they show much variation serologically. Several classifications have been reported. Murray (1) presents a table in which he has worked out the interrelations of six classifications, based on the agglutination test. To these we must add a German classification (2) into seven types whose relation to these other groupings is entirely unknown. These do not take into account the classification into five tropin groups made by Evans (3) in 1920. To-day the Gordon-Murray classification (4) is finding wide use in England and America, while the A, B, C, D (5) classification of Nicolle, Debains, and Jouan is recognized in France. The English I and III correspond with the French A, and II and IV with the French B; but the French C and D do not correspond with any English type.

Gordon has reported his four groups to be as distinct from each other as the paratyphoid species A and B (6). At the other extreme it appears that Walker (7) believes there is no justification for splitting the meningococcus into subgroups. He claims that immunization by any type of meningococcus results in a polyvalent serum, and considers that such a subdivision into groups could be made with different strains of any bacteria. Between these two extremes are many opinions.



Map showing geographic distribution, by type, of 235 strains of meningococci isolated in the United States during the period 1928–1930

CLASSIFICATION OF NEW STRAINS

Both on account of the interest felt in the type distribution and as a basis for further studies of the types, our 235 new strains of meningococci have been typed, using the Gordon-Murray classification. Monovalent type sera were made by immunizing young rabbits with representative strains which have been used at the National Institute of Health as standard type strains for several years.

(A) DESCRIPTION OF TECHNIQUE

Sera were prepared by immunizing rabbits weighing about 1,500 grams with intravenous injections of freshly made suspensions of living meningococci in a manner similar to that used by Butterfield and Neill (8). The cultures were grown on 1 per cent glucose agar slants for 18 hours, suspended in buffered 0.85 per cent salt solution of pH = 7.6, diluted to approximately 1,000,000,000 meningococci per cubic centimeter (a turbidity of 500 when compared with silica standards) (9) and injected immediately. Usually one-half billion organisms per kilogram of rabbit were injected on each of three successive days; after three or four days' rest, three similar injections were made; after another three or four days' rest period, a third series of doses was given, the last two consisting of 1,000,000,000 meningococci. These nine injections were followed by a week of rest, after which time a sample of blood was taken from the ear and tested for agglutinins. Usually these nine injections resulted in very good agglutinating sera, though often a second series of nine injections was given in order to produce sera of higher titer. If the test bleeding indicated a sufficiently high agglutinin content, the rabbits were bled from the heart and the serum obtained preserved by adding 50 per cent of glycerine.

Antigens for agglutination and absorption of agglutinins were made according to the method described by Butterfield and Neill, except that we used 1 per cent glucose agar instead of the plain agar medium and suspended our organisms in salt solution that had been buffered with phosphates to the desired pH (10). Although we used antigens with a turbidity of 1,000 (2,000,000,000 meningococci per cubic centimeter) for absorption of serums, a turbidity of 500 was found to be much more satisfactory for simple agglutination tests, and all of the agglutination experiments described in this paper were done with antigens of that density.

In these simple agglutination tests, both with polyvalent and with type sera, six serum dilutions were regularly included, the final dilutions after the addition of the antigen being 1:50, 1:100, 1:200, 1:400, 1:800, and 1:1600. In addition, normal horse serum in dilutions of 1:50 and 1:100 was used. The dilutions were made with 0.85 per cent NaCl buffered with phosphates to obtain the desired pH. As a

rule, pH 6.6 was found to be most satisfactory for this work, though frequently it was found desirable to raise the pH for individual strains that showed a tendency to agglutinate spontaneously, or to lower it for strains that were agglutinable with difficulty. One-half cubic centimeter of the serum dilution and 0.5 cubic centimeter of the antigen made a total volume of 1 cubic centimeter in each tube. These were set up in copper racks and incubated in a water bath at 56° C. for 18 to 24 hours. In recording the results, complete agglutination was designated by the figure 4, lesser agglutination by 3, 2, and 1, and no agglutination by 0. In reading these tests, dependence was not placed entirely upon the clearness of the supernatant fluid in the tubes, since some strains tend to settle out; but the nature of the flocculum was examined as well. Since the serums were preserved in 50 per cent glycerine, the final titer of any given serum was twice that indicated in the test.

For absorption of agglutinins, the technique described by Butterfield and Neill was found quite satisfactory. Suspensions of meningococci with a turbidity of 1,000 were added to a 1:10 dilution of the serum to be absorbed in the proportion to make a serum dilution of 1:50 and incubated for 20 to 24 hours at 37° C. This mixture was then centrifuged at high speed until the organisms were thrown down, and the clear supernatant fluid was used to set up agglutination tests with the required antigens. Serum dilutions in such cases, after the addition of the antigen, were 1:100, 1:200, 1:400, 1:800, and 1:1600.

(B) GENERAL PROCEDURE

As the strains of meningococci were received, they were plated out on blood agar, the purity of the cultures was checked, and antigens were made as described above. All strains were then tested for agglutinability with polyvalent antimeningococcus serum from eight different manufacturers and with normal horse serum.

Then simple agglutination tests were made, running all strains with each of the four type sera. Absorption of agglutinin tests were done wherever they seemed to be indicated. Although no rigid criterion was adopted, these absorption tests were usually made with all strains which were agglutinated by a type serum in a dilution representing more than one-quarter of its titer.

(C) RESULTS WITH POLYVALENT SERA

About 50 per cent of these 235 strains were well agglutinated from the first by polyvalent therapeutic sera from all eight manufacturers. Some were agglutinated by several of these sera and not by others. Some were very poorly agglutinated at first, but became more agglutinable after a period of laboratory maintenance. None was agglutinated by normal horse serum. The only strains that have

never been agglutinated by any of these polyvalent sera are the 5.9 per cent which we have not been able to place in any of the four usual types. Apparently they are not represented in the Gordon-Murray classification, nor in the polyvalent therapeutic sera, if the agglutination test be taken as a criterion, although they form a homogeneous group among themselves. These strains, as a new species, *Neisseria flavescens*, have been described in more detail in another paper (11).

(D) RESULTS WITH TYPING SERA

The Type IV strains were easily separated from the others by these simple agglutination tests with representative sera. There was relatively little cross agglutination with other types and but slight evidence of the close relation to II referred to by many others. In this respect some of the IV strains that we have found in this country differ from a IV that has come from Doctor Gordon, through the kindness of Doctor Krumwiede, and, to a less extent, from one which we have received recently from Doctor Murray, which are typical of those which these investigators found in England during the 1915–1918 period.

TABLE 2.—*The relative serological independence of Type IV strains of meningococci* [1]

Number	Strain	Type I serum						Type II serum						Type III serum						Type IV serum						Saline control
		100	200	400	800	1600	3200	100	200	400	800	1600	3200	100	200	400	800	1600	3200	100	200	400	800	1600	3200	
1	125	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	3	3	0	0
2	126	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	3	0	0
3	127	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	3	2	0	0
4	138	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	3	0	0
5	158	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	3	3	1	0
6	204	3	3	3	2	1	0	1	1	2	1	1	0	3	3	2	1	0	0	4	4	4	4	3	2	0
7	205	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	4	4	4	3	2	0	0
8	206	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	1	0	0
9	210	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	4	4	4	4	3	1	0
10	211	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	1	0
11	212	1	1	1	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	4	4	4	3	2	1	0
12	213	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	3	3	2	2	2	1	0
13	215	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	3	2	0
14	216	1	1	1	1	1	1	2	2	1	1	1	0	1	1	0	0	0	0	4	4	4	3	2	1	0
15	220	2	2	1	1	0	0	3	3	2	2	1	0	1	1	1	1	0	0	4	4	4	4	3	2	0
16	222	1	1	1	1	0	0	1	1	1	1	0	0	1	1	1	1	1	0	4	4	4	4	3	2	0
17	225	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	3	3	3	3	2	0	0
18	244	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	2	1	0	0
19	Control I	4	4	4	4	4	3	1	1	1	1	1	0	4	4	3	2	1	0	0	0	0	0	0	0	0
20	Control II	0	0	0	0	0	0	3	3	3	3	3	2	1	1	1	1	0	0	0	0	0	0	0	0	0
21	Control III	2	2	1	1	0	0	2	3	3	1	1	0	4	4	4	4	3	2	0	0	0	0	0	0	0
22	Control IV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	3	0	0
23	IV(Gordon)	2	2	2	1	1	0	3	3	3	2	2	3	2	2	1	1	0	0	4	4	4	3	3	2	0
24	IV(Murray)	1	1	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	4	4	4	3	2	1	0

[1] 4=complete agglutination; 0=no agglutination; 1, 2, and 3=varying degrees of agglutination.

Table 2 shows how easily the IV strains were separated from the other meningococci. Nine of these 19 IV strains showed no trace of cross agglutination with any other type; 4 showed a trace of relation to II; 5 showed traces of agglutination with I or III sera, as well as

II, but only 2 (strains 204 and 220) showed cross agglutination with all types to any significant degree. These two strains showed as much cross agglutination as the strain received from Doctor Gordon and more than the one received from Doctor Murray. The simple agglutination tests shown in this table were repeated several times with different lots of antigens and sera, each time with similar results. No absorption of agglutinin tests were needed in order to separate these Type IV strains from other meningococci.

Next to IV, the II strains were most easily recognized. Table 3 indicates that, while there is considerable cross agglutination between some II strains and those of other groups, this is not usually great enough to obscure the true type identity. Nevertheless, absorption was necessary with 4 of the 13 new II strains included in this report, because of the great amount of cross agglutination with the I serum. Cross agglutination with III was less common, and with IV it was least of all. This last observation is contrary to general opinion, since Types II and IV have usually been considered to be as closely related to each other as I and III.

TABLE 3.—*The relation of II strains to other groups of meningococci*

No.	Strain	Type I serum						Type II serum						Type III serum						Type IV serum						Saline control
		100	200	400	800	1600	3200	100	200	400	800	1600	3200	100	200	400	800	1600	3200	100	200	400	800	1600	3200	
1	122	2	2	0	0	0	0	4	4	4	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	134 [1]	4	4	4	4	3	0	4	4	4	4	3	0	4	4	4	0	0	0	0	0	0	0	0	0	0
3	149	0	0	0	0	0	0	3	3	2	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
4	173	1	0	0	0	0	0	4	4	4	4	3	2	1	1	1	0	0	0	1	1	0	0	0	0	0
5	230	2	2	2	0	0	0	4	4	3	3	2	0	2	2	2	0	0	0	1	1	1	0	0	0	0
6	245	0	0	0	0	0	0	3	3	2	2	2	0	1	1	0	0	0	0	1	1	0	0	0	0	0
7	249 [1]	4	4	3	2	2	0	4	4	4	3	2	0	2	2	2	2	0	0	1	2	2	0	0	0	
8	250 [1]	3	3	3	2	0	0	4	4	4	3	2	0	1	1	1	0	0	0	1	1	0	0	0	0	0
9	261	2	2	2	1	0	0	4	4	4	3	2	0	3	3	2	2	0	0	3	3	2	0	0	0	0
10	383	0	0	0	0	0	0	4	4	4	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	392	2	2	1	1	0	0	3	3	3	2	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
12	393 [1]	3	3	2	2	0	0	4	4	4	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0
13	394	2	2	2	1	1	0	3	3	3	2	1	0	1	1	1	1	0	0	1	1	1	0	0	0	0
14	Control II	0	0	0	0	0	0	3	3	3	2	2	0	3	2	1	0	0	0	0	0	0	0	0	0	0
15	II (Murray)	2	2	1	0	0	0	3	4	4	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	Control I	4	4	4	3	2	0	0	0	0	0	0	0	2	2	2	2	1	0	2	1	1	0	0	0	0
17	Control III	2	2	2	0	0	0	1	1	0	0	0	0	3	3	3	3	2	0	0	0	0	0	0	0	0
18	Control IV	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	3	3	3	3	1	0	0

[1] Absorption necessary.

The separation of the I and III strains from each other was often very difficult, and absorption of agglutinins was frequently necessary. Although many Type I strains were recognized as such in the simple agglutination tests, few Type III strains could be so easily identified. Since the great majority of strains included in this study are I's and III's, it is impossible to show the agglutination reactions of all, but Table 4 will suffice to illustrate some of the most common problems encountered in placing these I and III meningococci in these respective groups.

TABLE 4.—*Examples chosen to illustrate the most common types of behavior found in I and III meningococci*

No.	Strain	Type I serum 100	200	400	800	1600	3200	Type II serum 100	200	400	800	1600	3200	Type III serum 100	200	400	800	1600	3200	Type IV serum 100	200	400	800	1600	3200	Saline control	Type
1	102	4	3	2	1	0	0	3	2	2	1	0	0	4	3	2	1	0	0	0	0	0	0	0	0	0	([1])
2	103	4	3	2	1	0	0	0	0	0	0	0	0	4	2	2	0	0	0	0	0	0	0	0	0	0	([1])
3	104	3	4	3	3	2	0	3	2	0	0	0	0	3	2	0	0	0	0	1	1	0	0	0	0	0	I
4	108	4	4	4	3	1	0	1	1	1	0	0	0	3	2	0	0	0	0	1	0	0	0	0	0	0	I
5	109	4	4	4	3	3	1	3	3	1	0	0	0	4	4	4	3	1	0	0	0	0	0	0	0	0	([1])
6	111	4	4	4	4	4	3	1	1	1	0	0	0	4	2	1	0	0	0	0	0	0	0	0	0	0	I
7	116	4	4	4	2	0	0	2	0	0	0	0	0	4	3	3	1	0	0	0	0	0	0	0	0	0	([1])
8	117	4	4	4	3	1	0	4	3	3	2	1	0	4	4	3	3	2	1	1	0	0	0	0	0	0	([1])
9	121	4	4	3	3	2	0	4	4	3	2	1	0	4	4	4	4	1	0	2	1	0	0	0	0	0	([1])
10	130	4	4	4	4	3	2	2	1	0	0	0	0	4	4	2	0	0	0	0	0	0	0	0	0	0	I
11	140	4	4	4	4	2	1	3	3	2	1	0	0	4	4	4	2	2	0	1	0	0	0	0	0	0	([1])
12	141	3	3	1	0	0	0	3	2	1	0	0	0	4	4	4	3	3	2	1	0	0	0	0	0	0	III
13	146	3	3	2	0	0	0	3	3	2	0	0	0	4	4	4	4	3	2	2	1	0	0	0	0	0	III
14	154	2	0	0	0	0	0	2	2	1	0	0	0	3	3	3	3	2	0	1	1	0	0	0	0	0	III
15	169	4	4	4	3	1	0	4	4	3	1	0	0	4	4	4	4	2	0	0	0	0	0	0	0	0	([1])
16	170	3	2	1	1	1	1	1	1	0	0	0	0	3	2	1	1	0	0	1	1	1	0	0	0	0	([1])
17	171	2	1	1	1	0	0	1	1	0	0	0	0	4	3	3	2	1	1	1	0	0	0	0	0	0	III
18	176	4	4	4	3	0	0	1	0	0	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0	I
19	200	1	0	0	0	0	0	1	1	0	0	0	0	3	3	3	2	1	0	0	0	0	0	0	0	0	III
20	252	3	3	3	2	1	1	2	1	1	0	0	0	3	3	3	2	1	1	0	0	0	0	0	0	0	([1])
21	259	3	3	3	2	1	0	0	0	0	0	0	0	2	2	0	0	0	0	1	1	0	0	0	0	0	I
22	277	0	0	0	0	0	0	0	0	0	0	0	0	4	4	2	0	0	0	0	0	0	0	0	0	0	III
23	283	4	4	4	2	1	0	0	0	0	0	0	0	4	4	4	2	0	0	0	0	0	0	0	0	0	([1])
24	284	0	0	0	0	0	0	2	1	0	0	0	0	4	4	4	4	3	1	0	0	0	0	0	0	0	III
25	Control I	4	4	4	4	3	1	2	2	1	0	0	0	4	3	3	0	0	0	0	0	0	0	0	0	0	------
26	Control II	1	1	1	1	0	0	4	4	4	4	3	3	2	2	2	1	1	0	0	0	0	0	0	0	0	------
27	Control III	3	3	3	1	0	0	1	1	1	0	0	0	3	4	4	4	4	3	0	0	0	0	0	0	0	------
28	Control IV	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	3	2	0	0	------

[1] Absorption necessary.

Occasionally we found a group of strains, isolated from cases associated in the same epidemic, which showed very nearly identical serological behavior, as, for example, those from Salt Lake City in 1929; but more often there was great variation in the cultures found in any given outbreak, for example, those from Chicago, 1928. Every imaginable degree of interrelationship between the types seems likely to occur. In general, we have found it possible to consider our Type I and III strains in three general groups, and examples of these are shown in Table 4. First, we find strains which can be easily typed by simple agglutination with our standard sera. (Strains 104, 108, 111, 130, 176, and 259 are plainly of Type I; strains 141, 146, 154, 171, 200, 277, and 284 are plainly of Type III.) Second, we found strains which agglutinated equally well with both Type I and III sera, but which could be easily identified by absorption of agglutinins from our type sera with these strains. Such strains are 103, 116, 140, 170, and 252. Third, we found strains which could not be identified by such absorption of our standard type sera, these strains removing all agglutinins from both the I and III sera. Examples of these are 102, 109, 117, 121, 169, and 283. The behavior of these second and third groups in absorption tests is shown in Table 5.

TABLE 5.—*Typing I and III meningococci by absorption of agglutinins from standard type sera with individual strains*

Antigen	Type I serum					Type II serum					Type III serum					Saline control	Reported
	100	200	400	800	1,600	100	200	400	800	1,600	100	200	400	800	1,600		
ABSORBED WITH 102																	
102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	I or III (?).[1]
123 I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
55 II	0	0	0	0	0	4	3	3	3	2	0	0	0	0	0	0	
57 III	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
ABSORBED WITH 103																	
103	0	0	0	0	0						0	0	0	0	0	0	I.
123 I	0	0	0	0	0						3	2	0	0	0	0	
57 III	0	0	0	0	0						4	4	4	2	1	0	
ABSORBED WITH 109																	
109	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	I or III (?).[1]
123 I	2	1	0	0	0	2	1	0	0	0	2	1	0	0	0	0	
55 II	0	0	0	0	0	4	4	3	2	1	0	0	0	0	0	0	
57 III	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
ABSORBED WITH 116																	
116	0	0	0	0	0						0	0	0	0	0	0	I.
123 I	0	0	0	0	0						2	2	0	0	0	0	
57 III	0	0	0	0	0						4	4	4	2	1	0	
ABSORBED WITH 117																	
117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	I or III (?).[1]
123 I	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	
55 II	0	0	0	0	0	4	4	3	2	1	0	0	0	0	0	0	
57 III	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
ABSORBED WITH 121																	
121	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	I or III (?).[1]
123 I	0	0	0	0	0	2	2	0	0	0	2	1	0	0	0	0	
55 II	0	0	0	0	0	4	4	3	2	2	0	0	0	0	0	0	
57 III	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
ABSORBED WITH 140																	
140	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	I.
123 I	0	0	0	0	0	2	1	0	0	0	3	3	2	0	0	0	
55 II	0	0	0	0	0	4	4	3	2	1	0	0	0	0	0	0	
57 III	0	0	0	0	0	0	0	0	0	0	4	4	3	2	0	0	
ABSORBED WITH 169																	
169	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	I or III(?).[1]
123 I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
55 II	0	0	0	0	0	4	4	3	2	1	0	0	0	0	0	0	
57 III	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

[1] Could not be identified by absorbing our standard type sera.

TABLE 5.—*Typing I and III meningococci by absorption of agglutinins from standard type sera with individual strains*—Continued

Antigen	Type I serum					Type II serum					Type III serum					Saline control	Reported
	100	200	400	800	1,600	100	200	400	800	1,600	100	200	400	800	1,600		
ABSORBED WITH 170																	
170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	I.
123 I	0	0	0	0	0	0	0	0	0	0	3	3	3	0	0	0	
55 II	0	0	0	0	0	3	3	3	3	2	0	0	0	0	0	0	
57 III	0	0	0	0	0	0	0	0	0	0	4	4	3	2	2	0	
ABSORBED WITH 252																	
252	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	III.
123 I	4	4	3	2	2	0	0	0	0	0	0	0	0	0	0	0	
55 II	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
57 III	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
ABSORBED WITH 283																	
283	0	0	0	0	0						0	0	0	0	0	0	I or III(?).[1]
123 I	0	0	0	0	0						0	0	0	0	0	0	
57 III	0	0	0	0	0						0	0	0	0	0	0	
UNABSORBED																	
102	4	3	2	0	0	1	0	0	0	0	4	3	2	0	0	0	
103	3	3	3	1	0						4	4	4	4	3	0	
109	4	3	3	1	0	3	3	3	0	0	4	3	3	1	0	0	
116	4	4	3	2	0						4	4	3	2	0	0	
117	4	3	3	1	0	3	3	3	0	0	4	3	3	2	0	0	
121	3	3	3	2	0	3	3	3	2	0	3	3	3	2	0	0	
140	4	3	3	2	1	4	3	3	2	0	4	4	3	1	0	0	
169	4	4	3	0	0	4	4	3	2	1	4	3	3	2	1	0	
170	4	3	3	2	0	4	3	3	3	0	4	4	3	3	2	0	
252	4	4	3	2	1	2	1	0	0	0	3	3	3	2	1	0	
283	4	4	4	4	2						4	4	4	2	1	0	
123 I	3	4	4	3	3	2	1	1	0	0	4	3	2	0	0	0	
55 II	2	2	1	0	0	4	3	3	2	1	2	2	0	0	0	0	
57 III	3	3	2	1	1	1	1	0	0	0	3	3	3	2	1	0	

[1] Could not be identified by absorbing our standard type sera.

The standard type sera that we used were made from strains which, while specific, are broadly agglutinogenic for their types—that is, a serum produced with each will agglutinate the majority of strains belonging to that type. "Broad" strains are more likely to show cross agglutination than "narrow" ones. "Narrow" strains, on the other hand, are frequently so highly specific that they are not agglutinated by sera prepared with some other strains belonging to the same type, nor, conversely, do sera prepared with these narrow strains agglutinate all other strains that have been shown to belong to that type.

Apparently the relation between some I and III strains (i. e., those of our third class mentioned above, of which 102, 109, 117, 121, 169, and 283 are examples) is so close that they can not be distinguished by means of absorption tests with sera prepared from broad strains. It was necessary to seek for strains of narrower specificity in order to

separate them. On the basis of experiments illustrated in Table 4, 176 was chosen as an example of a narrow I and 146 as a narrow III. When these puzzling strains were tested with sera made from strains 176 and 146, all six proved to be of Type III. This is shown in the first part of Table 6. In the latter part of this table the homologous strains and other known I and III strains are included to illustrate the action of these narrow sera. For example, serum made with strain 176 agglutinates 108 and 111 well, but does not agglutinate 103 and 104, although all four of these strains have been definitely shown to be of Type I in Tables 4 and 5.

TABLE 6.—*Action of sera prepared from "narrow" strains upon I and III meningococci which could not be separated in Table 5*

No.	Strain	Serum from strain 176 Type I						Serum from strain 146 Type III						Type
		100	200	400	800	1600	3200	100	200	400	800	1600	3200	
1	102	2	0	0	0	0	0	4	3	3	2	1	1	III
2	109	1	0	0	0	0	0	3	3	3	2	1	1	III
3	117	0	0	0	0	0	0	4	4	3	3	2	1	III
4	121	0	0	0	0	0	0	3	3	3	3	2	1	III
5	169	2	1	0	0	0	0	4	4	3	3	2	1	III
6	253	4	4	2	1	0	0	4	4	4	4	2	1	III
7	176	4	3	3	3	3	2	2	1	0	0	0	0	I
8	146	3	2	1	1	0	0	4	4	4	3	2	2	III
9	Control I	4	4	4	3	1	1	4	4	3	2	0	0	I
10	Control III	1	1	1	0	0	0	2	2	2	1	0	0	III
11	101[1]	1	1	1	0	0	0	1	1	0	0	0	0	I
12	111	4	4	4	4	4	3	2	2	1	0	0	0	I
13	108	3	4	4	4	4	2	3	2	0	0	0	0	I
14	103[1]	1	1	0	0	0	0	1	0	0	0	0	0	I

[1] Experiments done at the same time with our standard type sera proved that these suspensions were easily agglutinable when broader sera were used

The behavior of these "broad" and "narrow" strains and of the sera prepared from them suggests that the usually recognized four main groups of meningococci, especially I and III, might be further divided into a possibly indefinite number of subgroups by using sera prepared with very narrow strains. Since the four main groups are not clear-cut and overlap to such an extent that some strains can be typed only with great expenditure of time and labor, further division into subgroups would make the typing of meningococci far more complicated than it is already.

The behavior of these "broad" and "narrow" strains further suggests that when the separation of I and III strains depends on the choice of narrow strains within each group as standards, a change to yet other narrow strains might alter their classification. That this can actually occur is shown in Table 7 in which strains 304, 321, 328, 335, 350, 357, and 366, are typed as I when sera prepared with 178 (I) and 146 (III) are used, and as III when sera prepared with 270 (I) and 153 (III) are employed. Conversely, strains 337 and 348 seem to be III with sera from 178 and 146, and I when sera from 270

and 153 are used. Strains 178, 146, 270, and 153, from which the sera were prepared, retained their original typing consistently.

TABLE 7.—*The apparent change in type of some strains of meningococci when a change is made in typing sera*

No.	Strain	Serum Ia (178) 100	200	400	800	1600	3200	Serum IIIa (146) 100	200	400	800	1600	3200	Indicated type	Serum Ib (270) 100	200	400	800	1600	3200	Serum IIIb (153) 100	200	400	800	1600	3200	Indicated type
1	304	4	4	4	3	1	0	4	4	1	0	0	0	I	0	0	0	0	0	0	4	4	3	2	0	0	III
2	321	4	4	4	3	3	1	4	4	4	2	1	0	I	3	3	2	1	0	0	4	4	4	3	2	0	III
3	328	4	4	4	4	3	2	4	4	4	2	0	0	I	3	3	2	0	0	0	4	4	4	3	2	0	III
4	335	4	4	4	4	3	0	4	4	3	1	0	0	I	1	1	1	0	0	0	4	4	4	4	2	0	III
5	337	2	2	1	1	0	0	4	4	4	4	3	0	III	3	3	3	3	3	0	3	3	3	2	0	0	I
6	348	4	4	4	4	2	0	4	4	4	4	4	3	III	4	4	4	4	4	3	4	4	4	2	2	0	I
7	350	4	4	4	3	1	0	4	4	4	1	0	0	I	0	0	0	0	0	0	4	4	4	3	1	0	III
8	357	4	4	4	3	2	1	3	3	2	1	1	0	I	2	2	2	1	0	0	4	4	4	3	2	1	III
9	366	4	4	4	4	3	1	4	4	3	1	0	0	I	4	4	4	0	0	0	4	4	4	4	3	0	III
10	178 (control)	4	4	3	3	3	2	2	2	1	0	0	0	I	4	4	3	3	2	1	3	1	0	0	0	0	I
11	146 (control)	3	3	2	1	0	0	4	4	4	4	3	2	III	3	3	3	2	2	0	4	4	4	4	3	2	III
12	270 (control)	4	4	3	2	1	0	2	2	1	0	0	0	I	3	3	3	2	1	0	1	1	1	0	0	0	I
13	153 (control)	2	2	0	0	0	0	3	3	3	3	0	0	III	2	2	2	1	0	0	3	3	3	2	2	0	III

Thus, differences in typing of the same strains in different laboratories can easily occur unless the type sera are prepared from strains sufficiently broad to be actually representative of that group. For example, meningococci 123, 267, and 178 are all Type I strains, but they are by no means just alike; 123 is so broad that serum made from it does not allow the separation of some I and III strains, even by absorption of agglutinins; 267 is a more highly specific I; 178 is such a narrowly specific I that sera prepared with it do not agglutinate some strains shown to be I by sera prepared with 267 or 123.

Our experience in typing these strains of meningococci makes us question the desirability of separating I and III into two groups. It seems here that III may be a subgroup of I, and it is considered as such by several classifications. Evans (12) found Types I and III to belong to the same tropin group. The time and labor involved in separating organisms as closely related as the I and III meningococci which have been prevalent in our recent epidemics, while of much interest from a theoretical point of view, seems of questionable practical value. On the other hand, the strains of Types II and IV which have been found during these same epidemics have been quite distinct.

The situation just described may not exist in other epidemics. It is possible that, while our outbreaks have been due to unusually broad strains, outbreaks at other times may be due to narrower strains which are as easily separable as we have found our II and IV strains to be.

(E) SUPPLEMENTARY TYPING

Since, when sera prepared with narrow strains are used for typing, a change in serum may give a change in results, it has seemed desirable to check our typing by more than one method. This was done in two ways: (1) By determining the agglutinability of these doubtful strains

with a number of different Type I and Type III sera prepared from both narrow and broad strains; and (2) by indirect typing, i. e., by immunizing rabbits with these doubtful strains and studying the agglutinative action of the resulting sera upon a number of strains of known type. This latter method of checking the typing was followed by us with nearly all our difficult strains.

(F) COMPARISON WITH ORIGINAL GORDON-MURRAY STRAINS

The fact that the type of some meningococci may seem to vary according to the strains chosen for preparing the type sera, made it seem important to compare our own standard type meningococci anew with strains representing the original classification of Gordon and Murray. Doctor Gordon had dried his original type strains *in vacuo;* and, when he learned of our studies, he generously placed these at our disposal. Doctor Murray kindly supplemented these antigens with cultures of the original strains which he has maintained in his laboratories. By immunizing rabbits with the dried antigens and with the cultures, sera have been obtained which represent the types as originally described by Gordon and Murray. With these sera we have checked, not only our standard cultures, but our entire collection of new strains, with the exception of a few which had been lost through laboratory accidents. The results have been interesting and illuminating. The fundamental differences that have been apparent in this general survey of our strains are as follows: (1) The original Type I was "narrower," or more specific, than the standard I's in general use in the United States, and, consequently, sera prepared from the dried powder given us by Doctor Gordon had fewer agglutinins for Type III strains, though there was, even then a considerable amount of overlapping. A very large number of the new strains isolated during our recent epidemics are typical Gordon-Murray I's. (2) The strains of IV obtained from both Gordon and Murray are "broader" than most of the IV strains found in the United States, and overlap a little more with other types than our own IV's. Most of the IV's that we have found in the United States form a narrow homogeneous group; and it has been suggested that our American group IV is different from the original IV described by Gordon and Murray. That a close relation exists between these American and English strains can be seen in Table 2, and it seems to us to be desirable to place all in group IV for the present. On the basis of the intensive work which we had already done, it has been a relatively simple procedure to check our entire collection with sera made from these English strains.

Thus, not only have most of our difficult strains been typed by at least three methods, but practically all have been finally confirmed by the sera prepared with materials representing the original type strains of Gordon and Murray.

(G) INAGGLUTINABLE STRAINS

Many strains seemed at first to be inagglutinable. These had to be considered individually. Some became readily agglutinable after several months of cultivation; with others an adjustment of the pH of the suspensions and serum dilutions nearer to the isolectric point for each individual strain solved the agglutination problem; sometimes it was necessary to plate out strains and to pick a number of colonies in order to obtain an agglutinable culture. Sometimes all these methods failed and it was necessary to resort to indirect typing by immunizing rabbits with these cultures and studying the agglutination activities of the sera thus obtained. In these ways we have succeeded in typing all of our meningococci.

(H) PRESENT TYPE DISTRIBUTION COMPARED WITH THAT OF FORMER YEARS

Table 8 shows the distribution of our 235 strains according to type, expressed in percentage. The first column shows the type distribution in the epidemic years 1918–19, as determined by Butterfield and Neill. Columns 2 and 3 show the distribution of types in two nonepidemic years as determined by Evans. Column 4 shows the distribution among the types during the epidemic years 1928–1930 as determined by ourselves. These typings are interesting to compare because they were done with practically the same technique, and the same four standard type strains of meningococci were used to prepare the type sera.

TABLE 8.—*Grouping of meningococci in the United States according to Gordon's types*

Type	1918-19 (128 strains)	1921 (16 strains)	1922 (15 strains)	1928-1930 (235 strains)
	Per cent	*Per cent*	*Per cent*	*Per cent*
I	37.5	18.7	6.7	50.2
II	25.8	18.7		5.5
III	21.1	12.6		31.4
IV	2.3	6.3	13.3	7.6
Not in above types	13.3	43.7	80.0	5.9

One hundred and ninety, or 81.6 per cent, of our strains fall into Groups I and III, which correspond to the French Type A. This is definitely a higher percentage than in the epidemics of 10 years ago. It is of interest to note that there is a low incidence at present of Type II, which has usually been next to I in frequency of occurrence. The increase in Type IV and the decrease in the number of strains which can not be placed in any type, as compared with previous epidemic years, are worthy of note. The majority of sporadic strains found during the interepidemic years of 1921 and 1922 were atypical and did not fall into any of the recognized types.

(I) THE GEOGRAPHIC DISTRIBUTION OF STRAINS ACCORDING TO TYPES

The geographic distribution of our 235 strains, with type indicated, is shown on the accompanying map. This map is obviously incom-

plete, for there have been many outbreaks from which we have obtained no cultures; but it represents the distribution of those strains which we were fortunate enough to receive. The localization of Type IV in the Middle West is striking, only one strain of this type being received from outside Chicago, and that one from Kansas City. In Chicago it seems to have been the dominant type.

It is also interesting to note that in small, definitely localized outbreaks all strains are alike in type; as, for example, Type I in Salt Lake City, Utah, and in Twin Falls County, Idaho, and Type II in Rocky Mount, N. C. The likeness of strains occurring in these small explosive outbreaks is far greater than is indicated by the fact that they have been "typed" alike. Our seven Salt Lake City strains are practically identical, crossing with Type II to a great extent. This close interrelation between Types I and II has not been commonly met in these studies, for a I and III relation has been the rule. Consequently it is interesting to note that we found very few such strains in the entire number studied—not more than 2 or 3 among those received from Illinois, Michigan, or Tennessee, and none among those from Indiana.

The first group of cultures received from Detroit (i. e., strains 117–121) have behaved in an identical manner throughout our studies, whereas those received later, and which were isolated during the same epidemic, have varied widely within the I and III groups. The San Francisco strains represent two different outbreaks, separated by one year; the first group received consisted of practically identical I's, and the second of equally similar III's. The Indiana strains were chiefly III's which might easily have been placed in several subgroups. Every possible intergradation between I and III seemed to occur among those from Tennessee. The Chicago strains were the most heterogeneous group of all, offering a number of variations of all four types, and *Neisseria flavescens* as well. Most of the Eastern strains represent more or less isolated cases, and great differences occur among them. Such observations upon strain variation become of considerable epidemiological interest when considered in connection with the slow and irregular progress of this 1928–1930 wave of meningococcus meningitis eastward from coast to coast.

SUMMARY

A serological study, based on agglutination and absorption of agglutinins, has been made of 235 strains of meningococci isolated during 1928–1930. At least 50 per cent of these were well agglutinated by the polyvalent sera prepared for therapeutic use by eight different manufacturers, and 40 per cent were agglutinable in less degree by most of these sera. The only strains which were not represented in any of these sera were the 14 (5.9 per cent) which have been described elsewhere.

These 235 strains of meningococci have been typed according to the Gordon-Murray classification, and their typing has been checked by comparison with original type strains received from Doctor Gordon and Doctor Murray. Of these, 118, or 50.2 per cent, were of Type I; 13, or 5.5 per cent, were II; 72, or 31.4 per cent, were III; 18, or 7.6 per cent, were IV; and 14, or 5.9 per cent, were not represented by any type in this classification.

The II and IV strains were easily separated from the others, but the I and III strains were often very difficult to identify, and even absorption of agglutinins sometimes failed to classify them. During the present epidemics these two groups have been so closely related that a change in strains used for preparing type sera can result in an apparent change of type in some strains within these groups. Thus, supplementary typing is often desirable, and this has been most satisfactorily done by means of monovalent sera prepared in rabbits with each individual strain.

The I and III strains have been predominant during our recent epidemics, more than 80 per cent of our cultures falling into these groups. A comparison of the grouping of our 1928–1930 strains with that of those studied during 1918–19 by Butterfield and Neill shows a marked increase in these groups, a strikingly low incidence of Type II, and a definite increase in Type IV, as well as a decline in the number of strains which did not fall into any of the recognized types. These groupings are in interesting contrast to those of the sporadic strains studied by Evans during interepidemic years, the majority of which could not be classified.

A map showing the geographic distribution of the 235 strains included in this study indicates that although small isolated outbreaks are often due to one type of meningococcus, more extensive epidemics may involve all varieties.

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OBSERVATIONS ON THE ASSAY OF THE ANTINEURITIC VITAMIN

Some of the Factors Involved in the Use of the Rat Method

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In a paper published in 1926, Goldberger, Wheeler, Lillie, and Rogers (1) presented a chart showing the development of polyneuritis in rats on a diet containing 27 per cent of autoclaved yeast. Only two of the four rats in that group showed signs of polyneuritis; the other two rats died without showing such signs. In another chart presenting the development of polyneuritis in rats on a diet containing 20 per cent of dried fresh beef, three of the four rats developed signs of polyneuritis. Because some of the rats died without showing such signs, the authors mentioned the rats as dying "with or without signs of polyneuritis."

In looking over some of Goldberger's unpublished data, we were impressed with the results of the following experiment:

Three groups, of four rats each, were placed on a basal diet [1] to which was added varying amounts of an antineuritic concentrate.[2] The diet of one group contained 0.35 per cent of the concentrate; that fed to the second group contained 0.25 per cent; while the diet of the third group contained only 0.125 per cent of the concentrate. The results obtained are shown herewith in Chart 1.

These results show that 0.25 per cent of the antineuritic concentrate in the diet was about sufficient for normal growth under these conditions, since on increasing the concentrate to 0.35 per cent there was only slight noticeable improvement. When the antineuritic concentrate was reduced to 0.125 per cent, all the rats ultimately developed polyneuritis. Inasmuch as the results of this experiment indicate that rats will develop signs of polyneuritis with a small amount of the antineuritic vitamin in the diet, it appears that the symptoms of polyneuritis in rats may be indicative of an insufficiency of the antineuritic

[1] This diet (300-C) had the composition shown in Table 1, but the casein was baked by means of a current of air heated by gas instead of in an electric oven, the temperature in this case being 120° 130° C., and the time of baking about 23 hours.

[2] In the preparation of this concentrate the preliminary treatment was essentially the same as that described by Goldberger (PUBLIC HEALTH REPORTS, vol. 41, p. 309, 1926), namely, an extract was prepared by intermittent percolation of whole white corn meal at room temperature with alcohol of 85 per cent by volume, until about 6.5 liters were obtained from 5 kilograms of the corn meal. But instead of concentrating in a distilling flask, the alcoholic extract, in this case, was treated with fullers' earth, which Seidell (5) has shown to have the property of adsorbing the antineuritic vitamin of brewers' yeast, and the adsorbed material was then extracted with N/10 NaOH, (about 800 c. c. per 100 gms.) by shaking in a shaking machine for about 15 minutes. The latter extract, after centrifuging, was adjusted to a pH of about 5.5, by means of hydrochloric acid, and again centrifuged. The solution was evaporated to dryness, under reduced pressure, at a temperature not exceeding about 70° C., the conditions being so adjusted that the time of heating of any portion of this solution did not exceed about two hours. The concentrate thus prepared is not entirely soluble in water, the insoluble residue corresponding to about 6 per cent In the tests here reported, however, only the soluble portion was used, although the dosages are expressed in terms of the weights of the total concentrate.

vitamin rather than its complete absence. It seems possible, therefore, to explain some of the failures to observe symptoms of polyneuritis in rats reported in the literature, as well as the partial failures such as those of Goldberger referred to above, as being probably due to the entire absence or the presence of a quantity of the antineuritic too small for this purpose. Of course, this explanation is to be considered only in instances where an adequate amount of the P–P factor is known to have been present in the diet.

Sandels (2) has recently reported similar results. Rats which were kept on his basal diet alone grew somewhat during the first 7 to 14 days, then rapidly declined, and died within 25 to 40 days. The majority of these rats became weak and unsteady on their feet but rarely showed characteristic symptoms of polyneuritis. On the

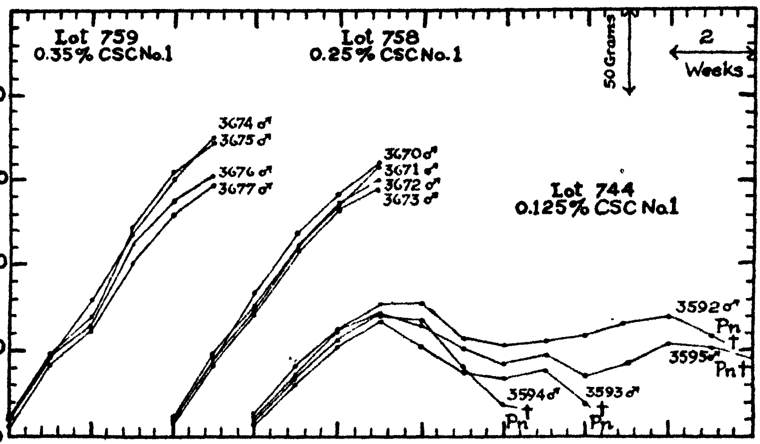

CHART 1.—Weight curves of three lots of young albino rats. The basal diet (300-C) was the same for all, but the proportion of added antineuritic concentrate varied, as indicated on the chart. All of the rats in the lot whose diet contained only 0.125 per cent of the antineuritic concentrate ultimately developed polyneuritis, indicated by "*Pn*." A plus sign (+) indicates death.

other hand, rats which received the antineuritic vitamin in amounts which were measurable, but which were insufficient for protection, developed, almost without exception, typical symptoms of polyneuritis. Sandels points out that his work confirms the results of Hofmeister (3), who also found that certain of the polyneuritic symptoms are associated with shortage rather than complete absence of the antineuritic vitamin.

In testing antineuritic preparations on rats, Goldberger used both the preventive and curative[3] tests. Hofmeister (3) apparently used the curative test the most. It is evident, however, that in order to be able to utilize advantageously the curative method, it is of importance to know the conditions which favor the production of the

[3] PUBLIC HEALTH REPORTS, vol. 41, p. 310, 1926: "Evidently our alcoholic extract of maize contains an essential that cures polyneuritis in the rat."

polyneuritic symptoms. We were particularly impressed with the importance of the composition of the basal diet in this connection when we were not successful in regularly producing polyneuritic symptoms in rats which were fed a basal diet that was as free as practically possible from the antineuritic vitamin and which was known to be adequate in the P–P factor. This basal diet contained casein which, after being thoroughly leached with water (after the method of McCollum), was baked at 140° to 142° C. for 24 hours and purified further by means of alcohol and ether extractions, which

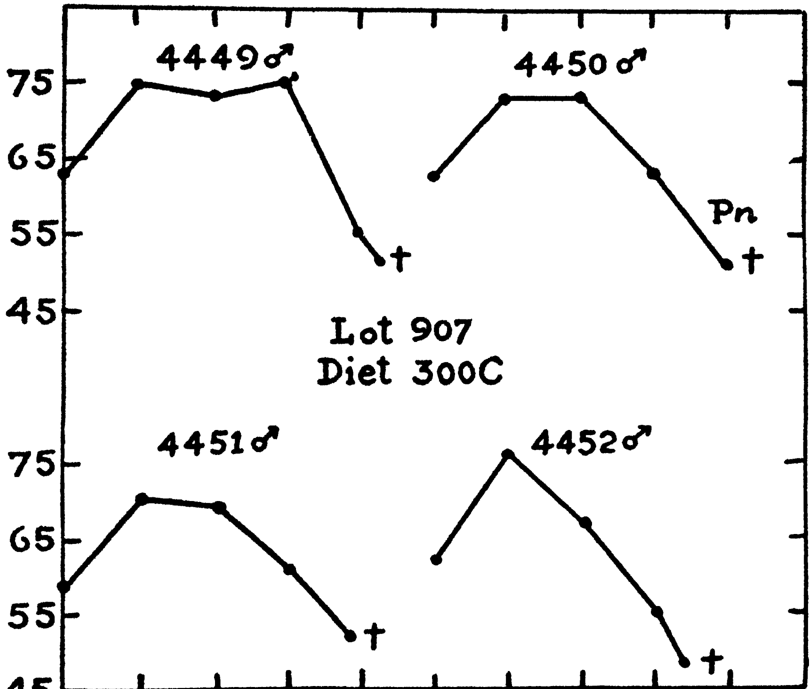

CHART 2.—Weight curves of four young albino rats on diet No. 300-C, the casein of which, after thorough leaching with acidulated water, was baked at 140°-142° C. for 24 hours and purified further by means of alcohol and ether extractions. Only one of these rats showed symptoms of polyneuritis, indicated by "*Pn*." All of the other rats in this lot died without showing symptoms of polyneuritis. A plus sign (+) indicates death

would be expected to remove or destroy the residual antineuritic if any of it still remained after the leaching. We have referred to this material as "BEA" casein. The results obtained in feeding this diet (300-C) to a group of four rats are shown in Chart 2.

It will be seen that on this diet in the case of this particular group, only one of the four rats showed signs of polyneuritis, while the remaining three died without showing the polyneuritic symptoms.

That the failure to obtain a greater proportion of polyneuritic rats in this case was not due to an insufficient amount of the P–P factor

in the autoclaved yeast was indicated by results obtained when the latter was increased from 15 to 20 per cent of the diet. Out of 5 rats thus treated, 2 developed polyneuritic symptoms while the other 3 died without showing polyneuritis.

Experiments were therefore carried out using diets of various composition, with the object of ascertaining which were the most favorable for the production of the polyneuritic symptoms in rats. The composition of the diets used and the number of rats in each group which showed polyneuritic symptoms are given in Table 1.

TABLE 1.—*Composition of diets and proportion of rats showing polyneuritis*

Diet No.	Composition [1] of diets		Number of rats	Number showing polyneuritis	Number dying without showing polyneuritis
		Per cent			
300-C	"BEA" casein	20.0	54	36	18
	Autoclaved yeast	15.0			
	Cottonseed oil	3.0			
	Cod-liver oil	2.0			
	Salt mixture	4.0			
	Starch (cooked)	56.0			
300-B	Same as 300-C, but having leached casein substituted for the "BEA" casein.		18	15	3
300-A	Same as 300-C, but having raw starch substituted for the cooked starch.		37	24	13
		Per cent			
348	Leached casein	20.0	3	3	0
	Autoclaved yeast	15.0			
	Cottonseed oil	10.0			
	Cod-liver oil	2.0			
	Salt mixture	4.0			
	Starch (cooked)	49.0			
348-A	Same as 300-C, but having 10 per cent cottonseed oil instead of 3 per cent (reducing the starch correspondingly).		3	3	0
348-B	Same as 348, but having 10 per cent Crisco instead of the 10 per cent cottonseed oil		4	4	0
348-C	Same as 348, but having raw starch substituted for the cooked starch		4	3	1

[1] The leached casein is prepared by leaching with daily changes of acidulated water after McCollum (McCollum, Simmonds, Shipley, and Park. Bull Johns Hopkins Hospital, vol 33, p. 398).

The "BEA" casein is prepared by baking leached casein in an electric oven at 140°–142° C. for 24 hours About 10 pounds are then packed in a metal percolator, wet with ether, and allowed to stand overnight The following morning the ether is allowed to drip, fresh ether is added in the afternoon; and the process repeated for three days, or until the percolate is clear. The casein is then removed, air dried, repacked in the percolator with 95 per cent alcohol, and allowed to drip after standing overnight. This is repeated three times. At the end of the third day fresh alcohol is added and allowed to drip overnight. The casein is then remov d and air dried.

The autoclaved yeast is prepared by autoclaving pure, dried bakers' or brewers' yeast for 2½ hours at 15 pounds pressure.

The raw starch is commercial cornstarch The cooked starch is prepared by mixing 6 pounds of this starch with four liters of warm water until a uniform paste results. Fourteen liters of tap water are brought to a boil and the starch paste slowly added, with constant stirring. The stirring is continued until the mixture just boils. This is then dried in shallow pans in a current of warm air, and ground.

The salt mixture is prepared according to the method of Osborne and Mendel, J. Biol. Chem. 1919, vol. 37, p. 572.

With the diets other than 300-C ("BEA" casein), 300-B (leached casein), and 300-A ("BEA" casein), the number of rats observed is too small to be used as a basis for definite conclusions. It is believed, however, that in the case of diet 300-C, in which 54 rats were observed and 18 (or 33 per cent) died without showing polyneuritis, and in the

case of diet 300–A, in which 37 rats were used and 13 (or 35 per cent) died without showing polyneuritis, and in the case of diet 300–B, in which 18 rats were used and only 3 (or 17 per cent) died without showing polyneuritis, we are justified in concluding that the leached casein in the diet appears distinctly more favorable for the production of polyneuritis in rats than the "BEA" casein.

In applying the curative rat test for evaluating the potency of antineuritic concentrates, Smith (4) has recently described a method which is based on the intravenous injection of a solution of the concentrate. As has been pointed out by Smith, however, not all concentrates are suitable for intravenous injection and only such as are free from extraneous toxic substances may be administered intravenously. Inasmuch as some antineuritic concentrates are not toxic when given by mouth but may kill the rat when administered intravenously, this method of administration is often unsatisfactory. In order to make the curative rat test also applicable to material of this nature, we carried out experiments in which the solution of the antineuritic concentrate to be tested was injected subcutaneously or intraperitoneally. Hofmeister (3) appears to have used subcutaneous injections occasionally, but he warns against its general use since, according to him, it is liable to produce shock [4] and quickly kill the rat and, therefore, he prefers to incorporate the antineuritic substance into the diet. It seemed desirable, however, to find out to what extent subcutaneous or intraperitoneal injections could be used if care were taken to treat the rat with the antineuritic concentrate as soon as definite spasticity occurred. Accordingly, six antineuritic concentrates [5] were tested by this procedure. The general technique was as follows:

The rats used were all from the laboratory colony, which has been carried on two stock diets for several generations. Young rats, both male and female, were selected, usually weighing from 55 to 65 grams. The experimental animals were kept in individual metal cages having a ¾-inch wire mesh bottom. Food and water were kept constantly present, and the animals were weighed once a week until they began to decline in weight. They were then weighed and examined daily for symptoms of polyneuritis. The examination for symptoms of polyneuritis was made by quickly turning the animal on its back.

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[4] Biochem. Zeit., 128, p. 548 (1922) "Bemerkenswert ist, dass der Tod der Tiere schon im ataktischen oder spastischen Stadium durch äussere Reize—z. B. eine subcutane Injektion—hervorgerufen werden kann. Es erinnert dies an die Tatsache, dass auch bei Menschen mit 'latenter Beriberi' durch Überanstrengung oder Traumen die schwersten Erscheinungen mit tödlichem Ausgang ausgelöst werden können. Ich habe durch einen derartigen 'Schock' so manches Tier bei Einbringung von antineuritischer Substanz verloren."

[5] The concentrates which are designated in Tables 2 and 3 as CSC No. 1 and CSC No. 2, respectively, were prepared as described in footnote 2 on p. 917 and represent different lots prepared at different times. Concentrates CA No. 1, CA No. 2, CA No. 3, and CA No. 4, referred to in Tables 4, 5, 6, and 7, respectively, were prepared from corn meal in a similar manner, by alcoholic extraction, and represent different fractions of the alcoholic extract. In these, however, the adsorption by fullers' earth was omitted.

This would frequently be sufficient to bring on a convulsive seizure with extension of the extremities, and in the more advanced cases rolling convulsive seizures. Unless a definite convulsive seizure could be elicited by this procedure the animal was considered as not having polyneuritis.

If a convulsive seizure could be elicited, the animal was given a suitable solution of the concentrate being tested, either subcutaneously or intraperitoneally. The animal was then observed in a similar manner for two days unless the polyneuritic symptoms disappeared earlier. If at the end of two days the convulsive seizures had not entirely disappeared the animal was considered as not recovered. The results obtained by the above procedure are given in the following tables:

TABLE 2.—*Results with antineuritic concentrate CSC No. 1*

Lot No.	Rat No. and sex	Weight of rat when treated	Mode of administration	Dose	Number of previous polyneuritic attacks	Gain in weight 1 day after treatment	Maximum gain in weight	Interval between treatment and maximum weight	Results	Duration of recovery
		Gm.		*Mgm.*		*Gm.*	*Gm*	*Days*		*Days*
878	4275M	105	Subcutaneously	50	0	9	13	2	Recovered	12
		85	do	50	1	0	0	0	Died [1]	
	4277M	104	do	50	1	6	6	1	Recovered	13
		82	do	50	2	0	0	0	Died [1]	
879	4278M	59	do	50	5	10	20	5	Recovered	11
		71	do	50	8	8	11	2	do	11
		69	do	50	9	8	15	3	do	13
		59	do	50	11	11	15	2	do	6
895	4380M	54	do	50	0	4	15	5	do	15
		53	do	50	2	7	15	4	do	11
	4381M	52	do	50	0	6	10	3	do	15
896	4387M	50	do	50	0	7	17	3	do	13
	4385M	54	do	50	0	8	19	4	do	15
903	4431F	53	do	50	0	5	13	3	do	14
878	4277M	99	do	25	0	3	5	2	Not recovered	
	4278M	64	do	25	6	10	10	1	Recovered	2
		68	do	25	7	10	10	1	do	2
		63	do	25	10	7	13	3	do	6
895	4380M	56	do	25	1	6	10	4	do	10
		48	do	25	3	3	9	4	do	7
	4381M	48	do	25	1	2	7	3	do	9
	4382M	54	do	25	0	5	7	4	do	9
921	4514M		do	25	0				do	12
904	4435M	50	do	20	0	−2			Not recovered	
	4436M	48	do	20	0	−1			Died [1]	
	4437M	54	do	20	0	3	7	3	Recovered	11
895	4380M	46	do	15	4	−2			Not recovered	

[1] Moribund when treated.

TABLE 3.—*Results with antineuritic concentrate CSC No. 2*

Lot No.	Rat No. and sex	Weight of rat when treated	Mode of administration	Dose	Number of previous polyneuritic attacks	Gain in weight 1 day after treatment	Maximum gain in weight	Interval between treatment and maximum weight	Results	Duration of recovery
		Gm.		*Mgm*		*Gm.*	*Gm.*	*Days*		*Days*
908	4454F	59	Intraperitoneally	40	2	4	13	16	Recovered	26
924	4537M	79	do	40	2	4	13	3	do	25
		72	do	40	3	6	18	4	do	20
		63	do	40	4	−1			Not recovered	
932	4567M	84	do	40	3	10	25	4	Recovered	13
		90	do	40	5	10	34	22	do	26
		98	do	40	4	−8			Not recovered	
945	4656M	71	do	40	1	6	21	6	Recovered	27
	4654M	85	do	40	2				do	24
	4653M	58	do	40	1	−2			Not recovered	
899	4399M	79	do	30	6	8	13	2	Recovered	9
906	4443F	50	do	30	3	−1			Not recovered	
916	4496M	50	Subcutaneously	30	0	5	10	3	Recovered	17
922	4518M	66	Intraperitoneally	30	1	7	14	3	do	12
924	4538M	52	do	30	0	0			Died [1]	
908	4455F	62	do	25	0	6	18	4	Recovered	22
918	4503M	48	do	25	1	5	11	3	do	15
		75	do	25	4	1	25	29	do	46
925	4540F	46	do	25	6	5	10	2	do	12
932	4567M	98	do	25	2	7	13	3	do	15
945	4653	62	do	25	0	4	12	5	do	14
	4654M	66	do	25	0	2	17	15	do	27
919	4508F	52	do	20	0	3	12	5	do	18
924	4535M	67	do	20	0	5	9	3	do	8
925	4540F	49	do	20	0	−1	3	3	do	7
		46	do	20	1	5	8	7	do	10
931	4566F	47	do	20	0	−2			Not recovered	

[1] Moribund when treated

TABLE 4.—*Results with antineuritic concentrate CA No. 1*

Lot. No	Rat No. and sex	Weight of rat when treated	Mode of administration	Dose	Number of previous polyneuritic attacks	Gain in weight 1 day after treatment	Maximum gain in weight	Interval between treatment and maximum weight	Results	Duration of recovery
		Gm.		*Mgm*		*Gm.*	*Gm.*	*Days*		*Days*
899	4399M	60	Subcutaneously	65	0	4	15	5	Recovered	8
918	4502M	61	Intraperitoneally	65	3	6	17	9	do	23
	4504M	49	do	65	4	0			Not recovered	
		68	do	65	0	8	23	14	Recovered	26
922	4518M	71	do	65	0	3	11	5	do	16
899	4399M	67	Subcutaneously	52	1	9	14	2	do	8
		65	do	52	2	10	15	2	do	8
908	4453F	46	do	52	0	−2			Not recovered	
918	4503M	64	Intraperitoneally	52	3	3	18	17	Recovered	25
924	4537M	62	do	52	1	1	36	32	do	51
906	4443F	52	do	45	2	−2			Not recovered	
	4448F	55	do	45	3	7	13	27	Recovered	36
910	4463F	56	do	45	2	6	17	26	do	44
918	4504M	56	do	45	3	0	6	5	do	8
921	4514M	63	do	45	4	−3			Not recovered	
925	4540F	48	do	45	3	3	6	2	Recovered	5
		48	do	45	4	4	7	2	do	6
884	4299M	65	Subcutaneously	39	0	6	10	2	do	6
	4300M	76	do	39	0	0			Not recovered	
899	4399M	66	do	39	1	4	4	1	do	
		78	Intraperitoneally	89	8	−2	2	2	do	
908	4454F	57	do	89	1	3	3	1	do	
912	4479M	70	do	89	0	−6			do	

TABLE 5.—*Results with antineuritic concentrate CA No. 2*

Lot. No.	Rat No. and sex	Weight of rat when treated	Mode of administration	Dose	Number of previous polyneuritic attacks	Gain in weight 1 day after treatment	Maximum gain in weight	Interval between treatment and maximum weight	Results	Duration of recovery
		Gm.		*Mgm.*		*Gm.*	*Gm.*	*Days*		*Days*
899	4399M	63	Subcutaneously	57	3	10	20	8	Recovered	9
906	4148F	46	do	57	1	3	14	12	do	31
910	4463F	46	do	57	0	3	14	11	do	26
912	4480M	42	do	57	0				Not recovered	
899	4399M	81	do	45	4	4	7	2	Recovered	8
908	4454F	48	do	45	0	5	22	43	do	53
916	4497M	41	do	45	0	0			Died [1]	
918	4502M	48	do	45	0	4	11	5	Recovered	12
	4503M	47	do	45	0	3	11	4	do	10
	4504M	51	do	45	0	3	16	11	do	22
921	4514M	65	Intraperitoneally	45	3	2	16	7	do	11
899	4399M	80	Subcutaneously	40	5	7	10	2	do	8
922	4516M	50	Intraperitoneally	40	3	−1			Not recovered	
932	4567M	93	do	40	0	1	9	4	Recovered	9
922	4517M	58	do	34	2	−4			Not recovered	

[1] Moribund when treated.

TABLE 6.—*Results with antineuritic concentrate CA. No. 3*

Lot No.	Rat No. and sex	Weight of rat when treated	Mode of administration	Dose	Number of previous polyneuritic attacks	Gain in weight 1 day after treatment	Maximum gain in weight	Interval between treatment and maximum weight	Results	Duration of recovery
		Gm		*Mgm*		*Gm*	*Gm*	*Days*		*Days*
918	4502M	51	Intraperitoneally	50	1	5	13	3	Recovered	15
931	4564F	43	do	50	0	−1			Died [1]	
	4565F	47	do	50	0	3	7	2	Recovered	8
925	4540F	52	do	42	2	−6	3	3	do	10
906	4443F	54	do	33	0	4	8	3	do	8
921	4513M	59	do	33	1	−1			Not recovered	
	4514M	59	do	33	2	6	9	2	Recovered	3
924	4535M	66	do	33	2	4	8	2	do	6
	4536M	62	do	33	1	−2			Not recovered	
919	4508F	51	do	25	1	−4			do	
925	4540F	50	do	25	2	4	4	1	do	

[1] Moribund when treated.

TABLE 7.—*Results with antineuritic concentrate CA. No. 4*

Lot. No.	Rat No. and sex	Weight of rat when treated	Mode of administration	Dose	Number of previous polyneuritic attacks	Gain in weight 1 day after treatment	Maximum gain in weight	Interval between treatment and maximum weight	Results	Duration of recovery
		Gm.		*Mgm.*		*Gm.*	*Gm.*	*Days*		*Days*
899	4399M	72	Intraperitoneally	54	7	9	18	2	Recovered	10
921	4513M	63	do	54	0	9	17	4	do	10
	4514M	60	do	54	1	6	21	6	do	11
922	4516M	52	do	41	2	6	11	2	do	12
	4517M	55	do	41	1	5	10	3	do	13
933	4570F	56	do	41	0	0			Not recovered	
906	4443F	54	do	34	1	6	12	3	Recovered	16
	4448F	52	do	34	2	4	9	4	do	16
918	4503M	52	do	34	2	4	23	15	do	26
924	4536M	61	do	31	0	4	12	4	do	9
906	4444F	48	do	27	0	3	13	19	do	53
924	4535M	60	do	27	1	3	7	3	do	4
918	4502M	56	do	20	2	2	10	12	do	26
921	4515M	75	do	20	0	−3			Not recovered	
924	4537M	64	do	20	0	0	12	10	Recovered	22

Tables 2 to 7 show that as the dosage approaches the minimum curative amount some of the animals will be cured and others will not. There is also an occasional failure with doses which should have produced cures. This is the result ordinarily obtained when dealing with such biological methods, and means that we have to decide, more or less arbitrarily, on the minimum number of rats to use for a test and the minimum percentage recoveries which we may regard as giving a positive result. If we may tentatively choose three rats as the minimum number to use for a given dose and regard it as curative when there are at least two recoveries out of the three, or a minimum of 60 per cent recoveries if more than three rats are used, we would obtain the following figures, expressed in milligrams, as the minimum curative doses of the concentrates:

	Mgm.
CSC No 1	25
CSC No 2	20
CA No 1	45
CA No 2	40
CA No 3	33
CA No 4	20

Hofmeister [5] states that he did not succeed in curing rats that had more than two recurrences of the attack. Smith (4), however, reports rats which were cured after the sixth attack. As is indicated in the above tables, in our experiments some of the rats were cured after five or six previous attacks. One rat (No. 4278, Table 2) was cured after the eleventh attack. It probably would not be quite safe, however, to test a preparation on a group of rats all of which have had more than two or three previous attacks.

SUMMARY

Results are reported, which are in agreement with the experience of others, to the effect that the symptoms of polyneuritis in rats appear to be associated with shortage rather than complete absence of the antineuritic vitamin.

The curative method for testing antineuritic concentrates on rats may be applied by injecting a suitable solution of the concentrate, subcutaneously or intraperitoneally.

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[5] Biochem. Zeit. vol. 129, p. 481 (1922): "Es ist mir nicht gelungen, mehr als 2 Rezidive erfolgreich zu bekämpfen."

DEATHS DURING WEEK ENDED MARCH 28, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended March 28, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Mar. 28, 1931	Corresponding week, 1930
Policies in force	75, 075, 351	75, 656, 614
Number of death claims	16, 129	15, 087
Death claims per 1,000 policies in force, annual rate	11. 2	10. 4

Deaths[1] from all causes in certain large cities of the United States during the week ended March 28, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Mar. 28, 1931				Corresponding week, 1930		Death rate [2] for first 13 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (81 cities)	9, 202	13. 5	813	[4] 64	13. 2	880	14. 0	13. 3
Akron	40	8. 1	5	49	7. 5	5	8. 6	8. 8
Albany [5]	41	16. 6	2	40	14. 7	5	15. 2	16. 6
Atlanta	70	13. 1	5	51	15. 9	8	16. 8	17. 4
White	36		4	63		4		
Colored	34	(6)	1	29	(6)	4	(6)	(6)
Baltimore [5]	248	15. 9	23	78	15. 1	13	17. 5	15. 7
White	185		16	69		10		
Colored	63	(6)	7	109	(6)	3	(6)	(6)
Birmingham	88	17. 0	9	91	16. 7	5	15. 5	14. 5
White	42		7	120		0		
Colored	46	(6)	2	49	(6)	5	(6)	(6)
Boston	218	14. 5	16	46	16. 5	30	16. 8	16. 1
Bridgeport	27	9. 6	1	17	17. 4	6	13. 3	14. 4
Buffalo	196	17. 6	27	110	14. 3	12	15. 5	14. 4
Cambridge	30	13. 7	1	20	16. 0	1	14. 2	14. 4
Camden	41	18. 0	6	105	19. 3	9	18. 7	15. 2
Canton	17	8. 3	1	23	10. 4	5	11. 1	11. 7
Chicago [5]	741	11. 2	62	55	10. 2	73	12. 0	11. 7
Cincinnati	150	17. 1	12	72	18. 1	9	18. 0	17. 6
Cleveland	240	13. 7	21	61	13. 2	23	12. 6	12. 4
Columbus	115	20. 3	6	59	15. 0	7	15. 1	15. 2
Dallas	72	13. 8	7		13. 1	9	12. 6	12. 7
White	46		5			7		
Colored	26	(6)	2		(6)	2	(6)	(6)
Dayton	52	13. 1	1	14	11. 6	5	14. 0	10. 6
Denver	92	16. 4	8	77	13. 9	11	16. 0	15. 6
Des Moines	34	12. 3	0	0	11. 3	1	12. 7	12. 9
Detroit	329	10. 4	39	62	9. 6	42	9. 7	10. 4
Duluth	19	9. 7	2	49	7. 2	2	12. 0	11. 4
El Paso	35	17. 4	7		15. 7	7	18. 7	18. 5
Erie	40	17. 7	1	19	9. 0	3	11. 6	11. 3
Fall River [5] [7]	29	13. 1	7	159	16. 3	7	13. 9	14. 1
Flint	28	8. 9	3	38	11. 2	10	8. 2	10. 4
Fort Worth	40	12. 5	3		10. 5	0	12. 0	12. 4
White	31		3			0		
Colored	9	(6)	0		(6)	0	(6)	(6)
Grand Rapids	25	7. 6	3	44	14. 5	4	9. 8	11. 4
Houston	77	13. 0	4		11. 3	4	12. 0	13. 1
White	51		3			3		
Colored	26	(6)	1		(6)	1	(6)	(6)
Indianapolis	128	18. 0	5	41	17. 0	4	15. 8	16. 3
White	110		4	88		2		
Colored	18	(6)	1	67	(6)	2	(6)	(6)
Jersey City	80	13. 1	15	133	13. 6	7	13. 8	12. 7
Kansas City, Kans	24	10. 2	2	41	13. 2	4	15. 9	12. 7
White	21		1	25		3		
Colored	3	(6)	1	127	(6)	1	(6)	(6)
Kansas City, Mo	105	13. 4	9	68	14. 0	14	15. 6	14. 4
Knoxville	30	14. 3	6	128	26. 0	7	14. 5	16. 5
White	26		6	143		7		
Colored	4	(6)	0	0	(6)	0	(6)	(6)
Long Beach	34	11. 6	2	48	11. 6	1	10. 9	10. 7
Los Angeles	271	10. 7	27	78	13. 5	15	11. 9	12. 4

Footnotes at end of table.

***Deaths*[1] *from all causes in certain large cities of the United States during the week ended March 28, 1931, etc.*—Continued**

City	Week ended Mar. 28, 1931				Corresponding week, 1930		Death rate [2] for first 13 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Louisville	59	10.0	4	34	15.8	7	17.5	14.7
White	42		2	20		6		
Colored	17	(6)	2	133	(6)	1	(6)	(6)
Lowell [7]	31	16.0	3	76	11.9	2	15.1	15.5
Lynn	22	11.2	2	52	9.7	5	12.8	12.5
Memphis	110	22.2	9	95	18.1	11	18.3	18.1
White	53		2	33		5		
Colored	57	(6)	7	203	(6)	6	(6)	(6)
Miami	39	18.1	5	127	14.1	0	15.0	13.7
White	28		2	71		0		
Colored	11	(6)	3	265	(6)	0	(6)	(6)
Milwaukee	140	12.4	21	91	10.3	17	10.8	10.8
Minneapolis	120	13.2	8	52	10.1	4	12.5	11.5
Nashville	55	18.4	7	104	22.7	8	18.4	17.4
White	33		7	140		7		
Colored	22	(6)	0	0	(6)	1	(6)	(6)
New Bedford [7]	28	13.0	2	53	10.7	4	13.4	12.1
New Haven	43	13.8	0	0	14.7	4	13.7	15.1
New Orleans	168	18.7	14	77	17.3	10	19.8	19.6
White	105		10	83		6		
Colored	63	(6)	4	65	(6)	4	(6)	(6)
New York	1,685	12.4	140	58	12.8	194	13.6	12.2
Bronx Borough	238	9.3	22	50	9.3	28	9.8	8.7
Brooklyn Borough	572	11.4	51	54	11.9	71	12.7	11.3
Manhattan Borough	680	19.5	54	92	19.1	78	20.7	18.0
Queens Borough	155	7.0	11	30	8.1	14	8.8	7.9
Richmond Borough	40	12.8	2	36	12.8	3	14.4	15.1
Newark, N. J	99	11.6	14	73	12.1	16	13.9	14.2
Oakland	63	11.2	4	51	12.0	4	12.3	12.5
Oklahoma City	40	10.6	7	97	11.1	6	11.7	10.6
Omaha	73	17.6	4	45	13.9	5	15.3	14.4
Paterson	49	18.4	4	69	13.2	1	16.2	13.6
Philadelphia	582	15.4	62	[illegible]	14.5	57	16.2	14.0
Pittsburgh	226	17.4	19	66	16.5	25	18.1	15.8
Portland, Oreg	72	12.2	3	36	13.1	0	13.1	14.2
Providence	58	11.9	6	55	15.0	9	15.4	15.5
Richmond	62	17.5	5	73	14.2	4	17.9	16.5
White	36		3	66		2		
Colored	26	(6)	2	87	(6)	2	(6)	(6)
Rochester	90	14.1	5	46	14.1	8	14.1	13.0
St. Louis	283	17.8	24	81	13.8	8	18.4	15.2
St. Paul	71	13.4	4	41	11.5	4	11.9	11.4
Salt Lake City [5]	42	15.3	5	74	15.6	5	13.4	14.1
San Antonio	72	15.6	7		18.3	11	15.3	18.8
San Diego	44	14.7	2	41	16.4	3	15.7	16.1
San Francisco	164	13.2	4	27	11.9	5	14.9	14.1
Schenectady	28	15.2	2	59	11.4	4	11.9	11.6
Seattle	96	13.5	3	28	10.5	3	13.3	12.0
Somerville	10	5.0	0	0	16.0	5	11.2	12.8
South Bend	22	10.6	1	25	7.9	2	9.4	9.8
Spokane	26	11.7	2	52	16.7	2	13.4	13.4
Springfield, Mass	27	9.2	1	15	12.8	6	14.0	14.7
Syracuse	46	11.3	7	83	9.9	8	13.0	12.9
Tacoma	26	12.6	4	103	13.2	1	15.5	13.5
Toledo	88	15.5	10	92	13.8	8	13.8	14.2
Trenton	52	21.9	6	104	17.3	4	19.8	18.5
Utica	31	15.8	2	52	23.5	5	16.5	16.2
Washington, D. C	187	19.8	17	94	16.3	13	18.7	16.1
White	121		9	74		7		
Colored	66	(6)	8	138	(6)	6	(6)	(6)
Waterbury	23	11.9	3	90	9.9	1	11.4	11.3
Wilmington, Del. [7]	34	16.6	5	108	14.2	4	16.6	15.8
Worcester	49	13.0	2	27	15.2	3	15.1	15.5
Yonkers	20	10.9	3	79	8.9	1	10.8	9.1
Youngstown	32	9.7	3	42	9.8	5	11.8	10.9

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for birth.
[4] Data for 76 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended April 4, 1931, and April 5, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended April 4, 1931, and April 5, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Apr. 4, 1931	Week ended Apr. 5, 1930	Week ended Apr. 4, 1931	Week ended Apr. 5, 1930	Week ended Apr. 4, 1931	Week ended Apr. 5, 1930	Week ended Apr. 4, 1931	Week ended Apr. 5, 1930
New England States:								
Maine	4	1	13	11	64	30	0	1
New Hampshire		2		3	54	16	0	0
Vermont	1	2			1	51	0	0
Massachusetts	33	82	9	13	461	1,099	1	10
Rhode Island	3	2	4		31	2	0	0
Connecticut	5	11	9	7	542	31	0	0
Middle Atlantic States:								
New York	107	122	[1] 52	[1] 58	2,244	1,401	14	22
New Jersey	43	113	8	19	771	1,275	2	3
Pennsylvania	77	136			3,764	1,412	14	17
East North Central States:								
Ohio	47	56	61	15	800	738	4	8
Indiana	29	32	57		1,341	80	13	18
Illinois	122	151	71	23	1,647	691	22	16
Michigan	28	38	21	2	119	1,571	6	39
Wisconsin	11	13	102	36	571	656	4	4
West North Central States:								
Minnesota	12	10	2	1	61	309	1	1
Iowa	2	9			30	512	1	9
Missouri	21	23	58	12	400	113	14	18
North Dakota	9	8			37	17	1	1
South Dakota	5	12	1	1	62	69	0	0
Nebraska	9	11	8		9	501	0	3
Kansas	7	11	7	2	30	629	4	4
South Atlantic States:								
Delaware		2	2		170	9	0	0
Maryland [2]	15	23	33	33	1,226	42	5	1
District of Columbia	7	9	4	1	327	8	4	0
Virginia								3
West Virginia	18	17	87	42	114	88	1	1
North Carolina	29	21	92	14	939	33	2	10
South Carolina	17	10	1,364	926	121		4	2
Georgia	5	7	706	85	136	215	2	2
Florida	8	10	10		171	396	0	1
East South Central States:								
Kentucky					188	61	4	1
Tennessee	4	6	186	66	202	63	1	
Alabama	15	13	451	147	441	242	10	6
Mississippi	9	10					0	12

[1] New York City only.

[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended April 4, 1931, and April 5, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Apr. 4, 1931	Week ended Apr. 5, 1930	Week ended Apr. 4, 1931	Week ended Apr. 5, 1930	Week ended Apr. 4, 1931	Week ended Apr. 5, 1930	Week ended Apr. 4, 1931	Week ended Apr. 5, 1930
West South Central States:								
Arkansas	5	3	307	44	50	25	1	6
Louisiana	22	28	48	13	4	86	2	1
Oklahoma [3]	6	13	106	78	45	597	0	4
Texas	26	62	72	200	98	178	0	3
Mountain States:								
Montana	4	------	------	------	2	4	3	2
Idaho	1	4	18	------	5	14	0	2
Wyoming	1	------	------	------	3	67	0	1
Colorado	10	8	------	------	273	728	0	0
New Mexico	4	8	17	------	69	94	1	3
Arizona	3	10	145	1	71	34	1	3
Utah [2]	1	1	4	4	3	228	0	20
Pacific States:								
Washington	5	8	5	------	56	446	1	7
Oregon	5	9	130	26	65	93	1	1
California	57	54	134	28	1,273	2,216	10	12

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Apr. 4, 1931	Week ended Apr. 5, 1930	Week ended Apr. 4, 1931	Week ended Apr. 5, 1930	Week ended Apr. 4, 1931	Week ended Apr. 5, 1930	Week ended Apr. 4, 1931	Week ended Apr. 5, 1930
New England States:								
Maine	[4] 2	1	20	52	0	0	0	3
New Hampshire	1	0	1	22	0	0	0	2
Vermont	0	0	2	22	0	1	0	0
Massachusetts	2	2	392	264	0	0	4	6
Rhode Island	0	0	58	17	0	0	0	0
Connecticut	0	0	59	117	0	0	0	1
Middle Atlantic States								
New York	2	0	970	605	3	4	9	19
New Jersey	0	1	270	244	0	0	2	2
Pennsylvania	0	1	569	546	0	2	8	13
East North Central States:								
Ohio	0	1	509	337	10	215	8	14
Indiana	1	0	353	176	111	174	7	1
Illinois	1	1	560	519	60	174	4	2
Michigan	1	0	292	310	9	72	3	2
Wisconsin	0	1	144	107	3	22	1	3
West North Central States:								
Minnesota	2	0	94	127	1	2	4	1
Iowa	0	0	78	76	63	111	1	0
Missouri	0	0	388	119	31	48	0	2
North Dakota	0	0	22	44	7	18	0	1
South Dakota	0	0	31	15	17	33	0	0
Nebraska	1	0	52	86	46	51	0	0
Kansas	1	0	42	113	124	131	0	4
South Atlantic States.								
Delaware	0	0	41	12	0	0	0	1
Maryland [2]	0	1	85	127	0	0	4	3
District of Columbia	0	0	23	17	0	0	0	0
Virginia	------	------	------	------	------	------	------	------
West Virginia	0	0	39	40	22	------	5	6
North Carolina	1	1	42	28	2	22	4	2
South Carolina	1	3	8	11	6	0	5	6
Georgia	0	0	71	23	0	0	3	1
Florida	0	0	7	3	2	0	0	0
East South Central States.								
Kentucky	0	0	108	59	3	21	3	7
Tennessee	0	1	39	37	4	6	2	7
Alabama	0	0	35	15	11	7	9	3
Mississippi	0	0	22	5	92	9	4	4
West South Central States:								
Arkansas	0	0	21	10	14	12	2	3
Louisiana	0	0	18	18	28	3	3	7
Oklahoma [3]	1	0	26	37	113	116	3	4
Texas	0	1	45	54	39	162	0	6

[2] Week ended Friday. [3] Figures for 1931 are exclusive of Oklahoma City and Tulsa. [4] Delayed reports.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended April 4, 1931, and April 5, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Apr. 4, 1931	Week ended Apr. 5, 1930	Week ended Apr. 4, 1931	Week ended Apr. 5, 1930	Week ended Apr. 4, 1931	Week ended Apr. 5, 1930	Week ended Apr. 4, 1931	Week ended Apr. 5, 1930
Mountain States:								
Montana	0	0	25	44	8	9	1	6
Idaho	0	0	7	4	1	13	0	8
Wyoming	0	0	23	8	1	3	4	0
Colorado	0	0	41	41	0	12	0	0
New Mexico	0	0	2	11	4	10	1	2
Arizona	0	0	4	14	1	28	2	0
Utah [1]	0	1	5	5	0	0	0	2
Pacific States:								
Washington	0	1	55	51	46	103	2	0
Oregon	0	0	13	28	25	28	1	2
California	2	4	110	164	26	73	6	5

[1] Week ended Friday.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
January, 1931										
Florida	3	44	97	2	228	1	1	40	6	5
Rhode Island	3	28	38		2		0	225	0	1
February, 1931										
Florida	9	30	842	9	637	1	0	31	0	13
Iowa	16	34	1		39		1	554	249	1
Kansas	12	59	544		71		5	279	373	2
Mississippi	15	67	8,479	1,115	190	528	1	131	90	20
New Hampshire		1	379					46		
March, 1931										
Arizona	14	12	82		622		0	21	9	2
Florida	5	35	448	8	702	2	0	26	6	10
Nebraska	2	42	16		30		1	226	224	2

January, 1931

	Cases
Chicken pox:	
Florida	154
Rhode Island	97
German measles:	
Rhode Island	8
Mumps:	
Florida	2
Rhode Island	33
Rabies in animals:	
Rhode Island	2
Septic sore throat:	
Rhode Island	1
Typhus fever:	
Florida	2
Undulant fever:	
Florida	1
Whooping cough:	
Florida	29
Rhode Island	44

February, 1931

	Cases
Chicken pox:	
Florida	240
Iowa	325
Kansas	727
Mississippi	1,092
Conjunctivitis:	
Kansas	1
Dengue:	
Mississippi	8
Dysentery:	
Mississippi (amebic)	27
Mississippi (bacillary)	170
German measles:	
Iowa	4
Kansas	3
Hookworm disease:	
Mississippi	233
Impetigo contagiosa:	
Iowa	4
Kansas	1

	Cases
Lethargic encephalitis:	
Kansas	2
Mumps:	
Florida	26
Iowa	58
Kansas	339
Mississippi	348
Ophthalmia neonatorum:	
Mississippi	14
Puerperal septicemia:	
Mississippi	39
Rabies in animals:	
Mississippi	10
Scabies:	
Kansas	2
Septic sore throat:	
Iowa	1
Kansas	4
Tetanus:	
Kansas	1
Trachoma.	
Mississippi	7
Typhus fever.	
Florida	1
Undulant fever:	
Iowa	3
Kansas	1
Vincent's angina:	
Iowa	7
Kansas	6
Whooping cough.	
Florida	29
Iowa	33

	Cases
Whooping cough—Continued	
Kansas	122
Mississippi	442

March, 1931

	Cases
Chicken pox:	
Arizona	54
Florida	290
Nebraska	390
Lethargic encephalitis:	
Arizona	1
Mumps:	
Arizona	26
Florida	35
Nebraska	602
Paratyphoid fever·	
Florida	1
Septic sore throat:	
Arizona	8
Nebraska	2
Trachoma·	
Arizona	16
Tularæmia	
Florida	2
Typhus fever:	
Florida	1
Undulant fever:	
Nebraska	1
Whooping cough.	
Arizona	20
Florida	60
Nebraska	79

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 95 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,340,000. The estimated population of the 88 cities reporting deaths is more than 31,795,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended March 28, 1931, and March 29, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,012	1,237	
95 cities	497	516	859
Measles.			
45 States	19,603	15,453	
95 cities	7,046	5,538	
Meningococcus meningitis			
46 States	163	277	
95 cities	79	139	
Poliomyelitis:			
46 States	13	14	
Scarlet fever.			
46 States	5,934	4,963	
95 cities	2,573	1,942	1,582
Smallpox:			
46 States	919	1,030	
95 cities	107	137	97
Typhoid fever:			
46 States	134	170	
95 cities	24	51	70
Deaths reported			
Influenza and pneumonia:			
88 cities	1,278	1,063	
Smallpox:			
88 cities	0	0	

City reports for week ended March 28, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	9	1	1		0	0	23	8
New Hampshire:								
Concord	0	0	0		0	6	0	1
Manchester	0	0	0		0	0	0	1
Nashua	0	0	0		0	25	1	0
Vermont								
Barre		0						
Burlington	0	0	0		0	0	0	0
Massachusetts:								
Boston	76	32	16	1	1	90	23	16
Fall River	3	3	4		0	1	11	5
Springfield	4	3	3		0	5	21	4
Worcester	7	4	1	1	0	4	3	4
Rhode Island:								
Pawtucket		1						
Providence	6	8	2		0	30	5	8
Connecticut:								
Bridgeport	3	5	1	3	3	1	3	4
Hartford	2	5	0		1	53	1	8
New Haven	25	2	0		1	425	13	7
MIDDLE ATLANTIC								
New York:								
Buffalo	26	11	11		2	381	50	31
New York	410	247	107	24	18	1,323	82	258
Rochester	7	8	0	5	1	5	5	10
Syracuse	8	5	0		1	14	2	3
New Jersey:								
Camden	5	5	8	1	1	30	15	8
Newark	126	16	3	3	0	19	6	12
Trenton	3	3	0	4	1	1	8	10
Pennsylvania:								
Philadelphia	163	63	5	34	9	1,007	49	88
Pittsburgh	120	17	6	6	11	91	65	69
Reading	12	2	1		0	83	22	2
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	6	8	2		8	109	21	16
Cleveland	196	27	10	29	7	33	293	31
Columbus	18	8	1	5	7	57	2	10
Toledo	32	4	12	8	1	1	30	12
Indiana:								
Fort Wayne	1	2	13		1	48	0	6
Indianapolis	62	4	3		2	390	21	16
South Bend	2	2	1		0	1	0	4
Terre Haute	0	0	0		2	2	0	2
Illinois:								
Chicago	131	94	72	268	8	228	92	57
Springfield	6	1	4	3	0	211	0	6
Michigan:								
Detroit	120	42	24	14	6	16	55	42
Flint	20	3	0	23	1	3	7	5
Grand Rapids	6	1	0	1	0	3	0	2

City reports for week ended March 28, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	19	0	0		0	0	117	0
Madison	31	1	1			2	54	
Milwaukee	214	13	5	4	4	76	669	8
Racine	6	1	0		0	13	8	1
Superior	19	0	0		0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	3	0	0		0	0	0	0
Minneapolis	73	13	7	1	4	103	138	12
St. Paul	46	7	0	1	1	19	9	10
Iowa								
Davenport	1	0	0			2	0	
Des Moines	6	1	0			1	1	
Sioux City	8	1	0			9	24	
Waterloo	4	0	0			0	0	
Missouri:								
Kansas City	38	4	7		1	120	3	11
St. Joseph	0	0	52		1	0	0	10
St. Louis	24	38	12	9	1	87	10	
North Dakota:								
Fargo	13	0	0		1		7	3
Grand Forks	1	0	1			0	2	
South Dakota:								
Aberdeen	4	0	0			0	0	
Sioux Falls	0	0	0			0	0	
Nebraska:								
Omaha	22	3	6		0	0	23	8
Kansas:								
Topeka	32	1	1	3	2	2	48	0
Wichita	20	2	0		1	0	4	4
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	2	2		0	82	3	8
Maryland:								
Baltimore	120	22	6	16	1	1,116	59	45
Cumberland	0	0	0	1	0	0	0	4
Frederick	1	0	1		0	6	0	0
District of Columbia:								
Washington	41	11	11	1	1	280	0	30
Virginia:								
Lynchburg	26	1	2		0	4	0	2
Norfolk	16		2		0	117	2	8
Richmond	1	2	3		5	216	0	6
Roanoke	3	1	2		2	2	1	1
West Virginia:								
Charleston	2	1	0	5	0	0	6	2
Wheeling	38	0	0		1	0	0	2
North Carolina:								
Raleigh	7	0	0		0	60	0	1
Wilmington	2	0	1		0	0	0	1
Winston-Salem	3	0	0		0	34	14	4
South Carolina:								
Charleston	1	0	0	26	1	9	0	9
Columbia	2	0	0		0	0	1	9
Greenville	1	0	0		0	0	0	0
Georgia:								
Atlanta	4	3	1	141	3	55	2	6
Brunswick	0	0	0		0	0	8	0
Savannah	2	1	2	6	1	2	12	2
Florida:								
Miami	15	3	0	2	2	6	0	4
St. Petersburg		0			2			5
Tampa	9	0	0	1	1	98	0	1

City reports for week ended March 28, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0	-	1	23	0	2
Tennessee:								
Memphis	47	4	3	-	8	136	13	13
Nashville	2	1	0	-	1	59	0	4
Alabama:								
Birmingham	5	2	4	43	9	62	1	9
Mobile	0	0	2	1	1	1	0	2
Montgomery	1	0	4	1	-	-	0	-
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	2	0	0	-	-	0	0	-
Little Rock	1	0	0	4	0	0	0	4
Louisiana:								
New Orleans	12	12	6	4	3	1	0	22
Shreveport	2	1	0	-	0	1	5	2
Oklahoma:								
Muskogee	2	0	0	2	-	0	2	-
Tulsa	8	1	2	-	-	14	0	-
Texas:								
Dallas	41	5	5	10	8	0	20	18
Fort Worth	6	3	3	-	1	0	0	6
Galveston	1	0	2	-	0	5	0	1
Houston	4	5	3	-	0	4	2	5
San Antonio	4	4	3	-	5	3	0	9
MOUNTAIN								
Montana:								
Billings	0	0	0	-	0	0	0	1
Great Falls	12	0	0	-	1	1	0	0
Helena	0	0	0	-	0	0	0	0
Missoula	0	0	0	27	0	0	0	1
Idaho:								
Boise	5	0	0	-	1	1	0	0
Colorado:								
Denver	65	7	10	-	3	20	31	8
Pueblo	-	2	-	-	-	-	-	-
New Mexico:								
Albuquerque	6	0	0	-	0	1	0	4
Arizona:								
Phoenix	0	1	1	-	0	0	0	3
Utah:								
Salt Lake City	4	2	0	-	2	1	8	2
Nevada:								
Reno	0	0	0	-	0	0	0	2
PACIFIC								
Washington:								
Seattle	63	3	2	-	-	7	17	-
Spokane	15	2	1	-	-	12	0	-
Tacoma	11	1	0	-	4	0	0	8
Oregon:								
Portland	32	8	1	18	4	37	11	11
Salem	3	1	0	-	-	5	16	-
California:								
Los Angeles	77	40	32	87	7	228	17	18
Sacramento	9	0	0	8	2	0	9	6
San Francisco	39	15	0	23	4	18	8	9

City reports for week ended March 28, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	4	11	0	0	0	0	0	0	0	8	33
New Hampshire:											
Concord	2	0	0	0	0	0	0	0	0	0	8
Manchester	2	0	0	0	0	1	0	0	0	0	22
Nashua	0	0	0	0	0	0	0	0	0	0	-------
Vermont:											
Barre	0	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Burlington	2	0	0	0	0	0	0	0	0	5	7
Massachusetts:											
Boston	85	151	0	0	0	15	0	1	0	34	218
Fall River	7	18	0	0	0	2	0	0	0	5	29
Springfield	9	9	0	0	0	1	0	0	0	8	21
Worcester	10	21	0	0	0	3	0	0	0	18	49
Rhode Island:											
Pawtucket	2	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Providence	14	41	0	0	0	2	0	0	0	2	58
Connecticut:											
Bridgeport	11	19	0	0	0	0	0	0	0	3	27
Hartford	6	5	0	0	0	0	0	0	0	1	38
New Haven	10	4	0	0	0	0	0	0	0	8	43
MIDDLE ATLANTIC											
New York:											
Buffalo	30	25	0	0	0	8	0	0	0	36	194
New York	365	539	0	0	0	97	0	5	0	179	1,685
Rochester	11	109	0	0	0	4	0	0	0	16	84
Syracuse	13	40	0	0	0	2	0	0	0	15	46
New Jersey:											
Camden	6	7	0	0	0	3	0	0	0	5	41
Newark	43	44	0	0	0	11	0	0	0	39	103
Trenton	5	22	0	0	0	3	0	0	0	0	52
Pennsylvania:											
Philadelphia	104	176	0	0	0	37	0	0	0	42	582
Pittsburgh	31	52	0	0	0	12	0	0	0	38	226
Reading	5	1	0	0	0	0	0	0	0	0	18
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	21	34	2	1	0	13	2	1	0	19	150
Cleveland	41	61	0	0	0	19	0	1	0	16	240
Columbus	12	16	1	0	0	12	1	0	0	0	115
Toledo	14	5	0	1	0	6	0	0	0	3	88
Indiana:											
Fort Wayne	5	3	0	0	0	0	0	0	0	0	29
Indianapolis	11	72	8	10	0	5	8	1	1	25	-------
South Bend	3	2	0	1	0	0	0	0	0	9	18
Terre Haute	3	0	0	0	0	0	0	0	0	0	17
Illinois:											
Chicago	136	258	2	0	0	36	2	0	0	51	741
Springfield	2	3	0	0	0	0	0	0	0	0	24
Michigan:											
Detroit	120	128	2	0	0	30	2	1	0	98	329
Flint	13	10	2	0	0	1	2	0	0	9	28
Grand Rapids	9	8	0	0	0	1	0	0	0	18	25
Wisconsin:											
Kenosha	2	3	0	0	0	0	0	0	0	0	4
Madison	7	9	0	0	-------	-------	0	0	-------	2	-------
Milwaukee	29	20	0	0	0	7	0	0	0	20	140
Racine	4	1	0	0	0	0	0	0	0	6	15
Superior	8	4	0	0	0	1	0	0	0	0	11
WEST NORTH CENTRAL											
Minnesota:											
Duluth	9	2	0	0	0	3	0	0	0	0	19
Minneapolis	43	20	5	2	0	3	5	1	1	33	120
St. Paul	32	10	0	0	0	2	0	0	0	22	71
Iowa:											
Davenport	2	3	1	10	-------	-------	0	0	-------	0	-------
Des Moines	10	7	1	7	-------	-------	0	0	-------	0	34
Sioux City	2	13	0	1	-------	-------	0	0	-------	0	-------
Waterloo	8	4	0	1	-------	-------	0	0	-------	1	-------

City reports for week ended March 28, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST NORTH CENTRAL—con.											
Missouri:											
Kansas City	27	10	2	5	0	8	2	0	0	2	105
St. Joseph	2	6	0	0	0	3	0	0	0	0	49
St. Louis	35	219	2	5	0	25	2	0	1	8	283
North Dakota:											
Fargo	1	4	0	0	0	0	0	0	0	0	13
Grand Forks	1	1	1	0	--------	--------	0	0	--------	0	--------
South Dakota:											
Aberdeen	1	0	0	0	--------	--------	0	0	--------	0	--------
Sioux Falls	2	1	1	1	--------	--------	0	1	--------	0	7
Nebraska:											
Omaha	4	13	3	18	0	5	3	0	0	2	73
Kansas:											
Topeka	2	1	1	0	0	0	1	0	0	0	14
Wichita	7	1	1	20	0	0	1	0	0	1	23
SOUTH ATLANTIC											
Delaware:											
Wilmington	5	13	0	0	0	0	0	0	0	1	34
Maryland:											
Baltimore	38	52	0	0	0	20	0	4	0	19	248
Cumberland	0	4	0	0	0	1	0	0	0	0	10
Frederick	0	0	0	0	0	0	0	0	0	0	--------
District of Col.:											
Washington	27	30	1	0	0	10	1	0	0	12	187
Virginia:											
Lynchburg	1	0	0	0	0	2	0	0	0	0	20
Norfolk	1	10	0	0	0	0	0	0	0	10	--------
Richmond	3	8	0	0	0	3	0	0	0	0	57
Roanoke	1	1	0	0	0	0	0	0	0	0	18
West Virginia:											
Charleston	0	0	1	0	0	0	1	0	0	2	13
Wheeling	2	0	0	0	0	1	0	1	0	2	24
North Carolina:											
Raleigh	0	2	0	0	0	1	0	0	0	16	14
Wilmington	1	0	0	0	0	1	0	0	0	20	12
Winston-Salem	0	0	1	0	0	2	1	0	0	9	20
South Carolina:											
Charleston	0	0	0	0	0	0	0	1	0	0	34
Columbia	0	0	1	0	0	4	1	0	0	2	57
Greenville	0	0	1	0	0	0	0	0	0	1	--------
Georgia:											
Atlanta	5	47	2	2	0	9	2	0	0	2	70
Brunswick	0	0	0	0	0	1	0	0	0	0	1
Savannah	1	0	1	0	0	3	1	0	0	1	32
Florida:											
Miami	1	0	0	0	0	0	0	0	0	2	39
St. Petersburg	0	--------	0	--------	0	1	0	--------	0	--------	41
Tampa	1	0	0	0	0	2	0	0	0	0	27
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	8	0	0	0	0	0	0	0	0	22
Tennessee:											
Memphis	10	66	2	2	0	8	2	0	0	4	110
Nashville	3	9	0	0	0	2	0	0	0	0	55
Alabama:											
Birmingham	3	8	1	0	0	6	1	0	0	3	88
Mobile	0	2	0	0	0	1	0	0	0	0	22
Montgomery	0	3	0	0	--------	--------	0	0	--------	0	--------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0	--------	--------	0	0	--------	1	--------
Little Rock	1	1	0	2	0	2	0	0	0	0	--------
Louisiana:											
New Orleans	8	14	0	16	0	15	0	2	1	2	168
Shreveport	1	1	1	3	0	8	1	0	0	0	25

City reports for week ended March 28, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL—Con.											
Oklahoma:											
Muskogee	1	0	2	0			0	0		0	
Tulsa	2	3	2	10			0	0		0	
Texas:											
Dallas	5	2	4	1	0	0	4	0	0	16	72
Fort Worth	3	2	4	9	0	1	0	0	0	0	40
Galveston	1	0	0	0	0	0	0	0	0	0	19
Houston	2	4	2	1	0	5	2	0	0	0	77
San Antonio	0	1	0	0	0	7	0	0	0	0	72
MOUNTAIN											
Montana:											
Billings	1	0	0	3	0	2	0	0	0	2	11
Great Falls	2	2	0	0	0	1	0	0	0	12	17
Helena	0	1	0	0	0	0	0	0	0	0	6
Missoula	1	0	0	1	0	0	0	0	0	1	4
Idaho:											
Boise	0	0	0	1	0	0	0	0	0	0	10
Colorado:											
Denver	18	17	0	0	0	4	0	0	0	23	93
Pueblo	2		1				1				
New Mexico:											
Albuquerque	1	0	0	0	0	4	0	0	0	4	11
Arizona:											
Phoenix	1	0	1	0	0	10	0	0	0	0	
Utah:											
Salt Lake City	3	4	1	0	0	1	1	0	0	27	42
Nevada:											
Reno	0	0	1	0	0	0	1	0	0	0	8
PACIFIC											
Washington:											
Seattle	10	3	2	1			2	1		32	
Spokane	7	1	8	5			8	0		1	
Tacoma	8	2	4	1	0	0	4	0	0	4	26
Oregon:											
Portland	5	2	13	3	0	5	0	0	0	2	72
Salem	0	0	0	0	0	0	0	0	0	0	
California:											
Los Angeles	40	42	3	4	0	22	3	2	0	35	271
Sacramento	3	0	1	0	0	4	1	0	0	31	35
San Francisco	25	5	1	0	0	16	1	2	1	37	186

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Massachusetts:[1]									
Boston	0	0	1	1	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	1	0	0	0	0	0	0	0
New York	9	6	1	3	0	0	1	0	0
Rochester	0	0	1	0	0	0	0	0	0
New Jersey:									
Newark	2	0	1	1	0	0	1	0	0
Pennsylvania:									
Philadelphia	6	5	1	1	0	0	0	0	0
Pittsburgh	2	0	0	0	0	0	0	0	0

[1] Rabies (in man); 1 case and 1 death at Worcester, Mass.

City reports for week ended March 28, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cleveland	1	1	0	0	0	0	0	0	0
Indiana:									
Indianapolis	2	2	0	0	0	0	0	0	0
South Bend	1	0	0	0	0	0	0	0	0
Illinois:									
Chicago	13	11	1	0	0	0	0	0	0
Springfield	0	1	0	0	0	0	0	0	0
Michigan:									
Detroit	4	2	0	0	0	0	0	1	1
WEST NORTH CENTRAL									
Missouri:									
Kansas City	3	1	0	0	0	0	0	0	0
St. Joseph	0	1	0	0	0	0	0	0	0
St. Louis	4	1	1	2	0	0	0	0	0
Nebraska:									
Omaha	2	0	0	0	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	1	0	1	0	0	0	0	0	0
District of Columbia:									
Washington	2	1	0	0	0	0	0	0	0
North Carolina:									
Winston-Salem	0	0	0	0	1	1	0	0	0
South Carolina:									
Columbia	1	3	0	0	0	0	0	0	0
Georgia:									
Atlanta	1	1	0	0	0	0	0	0	0
Savannah [1]	0	0	0	0	2	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	6	2	0	0	0	0	0	0	0
Nashville	3	0	0	0	0	0	0	0	0
Alabama:									
Birmingham	7	1	0	0	5	2	0	0	0
Mobile	1	0	0	0	1	0	0	0	0
Montgomery	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orelans	3	1	0	0	0	0	0	0	0
Texas:									
Dallas	0	0	0	0	3	2	0	0	0
Fort Worth	0	0	0	0	0	2	0	0	0
Houston	0	0	0	0	0	1	0	0	0
San Antonio	2	1	0	0	0	0	0	0	0
MOUNTAIN									
Utah:									
Salt Lake City	1	0	0	0	0	0	0	1	1
PACIFIC									
Oregon:									
Portland	0	0	0	1	0	0	0	0	0
California:									
Los Angeles	2	0	0	0	0	0	0	0	0

[1] Typhus fever; 1 case at Savannah, Ga.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended March 28, 1931, compared with those for a like period ended March 29, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities February 22 to March 28, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Feb. 28, 1931	Mar 1, 1930	Mar 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930	Mar. 28, 1931	Mar. 29, 1930
98 cities	70	104	73	88	[2] 66	101	[3] 65	97	[4] 78	82
New England	89	121	106	92	79	92	67	65	[5] 70	56
Middle Atlantic	56	103	61	85	67	94	64	97	63	80
East North Central	78	122	75	94	[6] 78	134	[7] 73	132	82	114
West North Central	55	120	71	118	63	110	73	74	163	64
South Atlantic	77	96	93	78	53	104	73	90	61	70
East South Central	58	54	29	36	35	24	[8] 8	36	76	48
West South Central	132	101	118	143	[9] 66	111	71	136	64	125
Mountain	87	35	61	88	[10] 29	26	[10] 19	88	[10] 95	44
Pacific	57	63	63	38	55	63	51	45	69	34

MEASLES CASE RATES

	Feb. 28, 1931	Mar 1, 1930	Mar 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930	Mar. 28, 1931	Mar. 29, 1930
98 cities	703	538	769	620	[2] 913	646	[3] 1,027	776	[4] 1,196	879
New England	655	506	909	593	1,346	743	1,527	1,030	[5] 1,543	1,117
Middle Atlantic	645	316	874	417	1,026	396	1,158	539	1,321	611
East North Central	300	345	369	442	[6] 449	471	[7] 566	538	723	654
West North Central	874	939	643	938	595	781	492	994	650	908
South Atlantic	2,800	148	2,238	535	2,753	481	3,442	617	3,879	697
East South Central	1,042	753	1,036	717	1,146	634	[8] 1,073	1,291	1,635	968
West South Central	24	704	68	505	[9] 33	617	51	547	47	784
Mountain	1,209	1,507	1,332	2,106	[10] 333	2,449	[10] 219	2,8[illegible]0	[10] 219	2,987
Pacific	223	1,636	347	1,581	356	1,881	394	1,800	519	2,184

SCARLET FEVER CASE RATES

	Feb. 28, 1931	Mar 1, 1930	Mar 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930	Mar. 28, 1931	Mar. 29, 1930
98 cities	373	357	345	321	[2] 376	337	[3] 385	316	[4] 402	308
New England	606	402	527	431	569	426	676	372	[5] 700	363
Middle Atlantic	381	308	359	283	389	327	392	294	454	299
East North Central	364	510	346	448	[6] 395	461	[7] 400	418	378	383
West North Central	509	341	492	345	518	308	589	335	580	306
South Atlantic	363	258	351	206	310	210	342	286	310	272
East South Central	553	173	401	173	477	96	[8] 231	179	559	233
West South Central	125	108	71	139	[9] 99	167	101	108	78	111
Mountain	305	388	305	300	[10] 428	379	[10] 323	352	[10] 228	458
Pacific	145	352	121	241	96	229	110	202	104	204

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1931 and 1930, respectively.
[2] Cleveland, Ohio, Springfield, Ill., Dallas, Tex., and Pueblo, Colo., not included.
[3] South Bend, Ind., Memphis, Tenn., Pueblo, Colo., not included.
[4] Barre, Vt., Pawtucket, R. I., and Pueblo, Colo., not included.
[5] Barre, Vt., and Pawtucket, R. I., not included.
[6] Cleveland, Ohio, and Springfield, Ill., not included.
[7] South Bend, Ind., not included.
[8] Memphis, Tenn., not included.
[9] Dallas, Tex., not included.
[10] Pueblo, Colo., not included.

Summary of weekly reports from cities February 22 to March 28, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

SMALLPOX CASE RATES

	Week ended—									
	Feb. 28, 1931	Mar. 1, 1930	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930	Mar. 28, 1931	Mar. 29, 1930
98 cities	20	30	13	25	[2] 20	25	[3] 21	24	[4] 17	22
New England	0	0	0	2	0	0	0	0	[5] 0	2
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	11	40	15	24	[6] 10	30	[7] 8	20	7	17
West North Central	128	91	57	79	132	70	130	97	99	99
South Atlantic	0	2	0	2	0	4	0	2	4	8
East South Central	23	6	23	18	0	24	[8] 8	6	12	18
West South Central	64	111	47	63	[9] 74	24	95	49	78	45
Mountain	9	26	17	9	[10] 19	9	[10] 10	35	[10] 48	26
Pacific	39	87	12	105	41	115	43	103	22	71

TYPHOID FEVER CASE RATES

	Feb. 28, 1931	Mar. 1, 1930	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930	Mar. 28, 1931	Mar. 29, 1930
98 cities	7	8	4	8	[2] 3	6	[3] 4	8	[4] 4	8
New England	5	0	5	2	0	5	2	0	[5] 3	2
Middle Atlantic	6	4	3	4	2	5	2	6	2	15
East North Central	3	1	1	2	[6] 1	1	[7] 2	1	2	3
West North Central	11	6	11	8	0	4	8	10	2	4
South Atlantic	22	60	12	40	6	12	16	14	12	6
East South Central	6	30	17	12	17	24	[8] 0	84	0	30
West South Central	14	0	0	31	[9] 16	7	10	10	7	7
Mountain	0	0	0	0	[10] 0	53	[10] 0	18	[10] 0	0
Pacific	4	6	2	6	4	10	8	10	10	2

INFLUENZA DEATH RATES

	Feb. 28, 1931	Mar. 1, 1930	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930	Mar. 28, 1931	Mar. 29, 1930
91 cities	50	19	44	16	[2] 34	13	[3] 31	15	[4] 29	14
New England	24	12	19	19	36	2	19	2	[5] 15	10
Middle Atlantic	40	16	32	13	23	11	23	14	20	10
East North Central	61	16	48	12	[6] 27	9	[7] 28	9	25	11
West North Central	74	15	59	3	50	6	47	12	35	6
South Atlantic	79	28	73	36	57	18	49	28	32	16
East South Central	76	52	139	58	101	84	[8] 130	78	126	97
West South Central	45	64	52	32	[9] 55	43	35	25	55	32
Mountain	17	18	44	35	[10] 29	18	[10] 38	62	[10] 67	53
Pacific	11	10	34	2	36	2	34	7	41	2

PNEUMONIA DEATH RATES

	Feb. 28, 1931	Mar. 1, 1930	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930	Mar. 28, 1931	Mar. 29, 1930
91 cities	212	193	194	166	[2] 189	155	[3] 184	161	[4] 180	163
New England	236	232	185	220	147	169	183	218	[5] 163	220
Middle Atlantic	217	219	229	181	214	178	216	159	220	187
East North Central	193	179	160	141	[6] 130	127	[7] 132	148	125	117
West North Central	218	138	218	129	159	144	215	123	171	135
South Atlantic	312	236	265	222	332	196	209	222	263	212
East South Central	271	175	227	214	240	233	[8] 222	188	189	227
West South Central	221	185	148	160	[9] 211	142	180	199	211	164
Mountain	191	247	131	150	[10] 209	123	[10] 124	194	[10] 133	176
Pacific	91	62	101	75	125	65	101	77	98	92

[2] Cleveland, Ohio, Springfield, Ill., Dallas, Tex., and Pueblo, Colo., not included.
[3] South Bend, Ind., Memphis, Tenn., Pueblo, Colo., not included.
[4] Barre, Vt., Pawtucket, R. I., and Pueblo, Colo., not included.
[5] Barre, Vt., and Pawtucket, R. I., not included.
[6] Cleveland, Ohio, and Springfield, Ill., not included.
[7] South Bend, Ind., not included.
[8] Memphis, Tenn., not included.
[9] Dallas, Tex., not included.
[10] Pueblo, Colo., not included.

FOREIGN AND INSULAR

CANADA

Quebec Province—Communicable diseases—Week ended March 28, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended March 28, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Mumps	27
Chicken pox	68	Poliomyelitis	1
Diphtheria	30	Puerperal septicemia	1
Erysipelas	7	Scarlet fever	78
German measles	10	Tuberculosis	64
Influenza	1	Typhoid fever	19
Measles	234	Whooping cough	28

Quebec Province—Vital statistics—November, December, 1930, January, 1931.—Births, deaths, and marriages for the months of November and December, 1930, and January, 1931, in the Province of Quebec, Canada, with deaths from certain specified causes, are shown in the following table:

	November, 1930	December, 1930	January, 1931
Estimated population	2,735,000	2,735,000	2,782,500
Births	5,791	6,174	6,351
Birth rate per 1,000 population	25.8	27.9	26.9
Deaths	2,601	2,834	3,195
Death rate per 1,000 population	11.6	12.2	13.5
Marriages	988	1,034	944
Deaths under 1 year	680	730	811
Deaths under 1 year per 1,000 births	117.4	112.7	127.7
Deaths from—			
Cancer	172	180	194
Cerebrospinal meningitis		1	1
Diabetes	30	30	44
Diarrhea	144	88	100
Diphtheria	33	35	42
Heart disease	316	351	353
Influenza	41	51	102
Measles	11	13	9
Nephritis			157
Pneumonia	226	262	354
Poliomyelitis		1	
Scarlet fever	23	15	20
Syphilis	8	19	12
Tuberculosis, pulmonary	165	200	198
Tuberculosis, other forms	46	37	43
Typhoid fever	30	26	13
Violence	83	91	51
Whooping cough	36	46	53

MEXICO

Vera Cruz—Deaths—March 2–29, 1931.—During the period from March 2 to 29, 1931, deaths from certain causes were reported in Vera Cruz, Mexico, as follows:

Cause of death	Deaths	Cause of death	Deaths
Bronchitis	2	Septicemia	1
Cancer	4	Syphilis	7
Gastro-intestinal disorders	33	Tuberculosis	22
Hookworm disease	1	Typhoid fever	1
Influenza	6	All other causes	56
Leprosy	1		
Malaria	4	Total	148
Pneumonia	10		

PANAMA CANAL ZONE

Communicable diseases—February, 1931.—During the month of February, 1931, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	13		Pneumonia		20
Diphtheria	46		Scarlet fever	3	
Dysentery (amebic)	4		Tuberculosis		37
Malaria	100	4	Typhoid fever	4	
Measles	64		Whooping cough	2	

PORTO RICO

San Juan—Communicable diseases—Five weeks ended March 7, 1931.—During the five weeks ended March 7, 1931, cases of certain communicable diseases were reported in San Juan, Porto Rico, as follows:

Disease	Cases	Disease	Cases
Diphtheria	8	Tetanus	1
Malaria	27	Tetanus, infantile	2
Ophthalmia neonatorum	1	Whooping cough	2

TRINIDAD

Port of Spain—Vital statistics—February, 1930, 1931.—The following statistics for the months of February, 1930 and 1931, are taken from a report issued by the Public Health Department of Port of Spain, Trinidad:

	February			February	
	1930	1931		1930	1931
Number of births	137	140	Death rate per 1,000 population	22.6	19.7
Birth rate per 1,000 population	28.4	27.1	Deaths under 1 year	23	23
Number of deaths	117	102	Deaths under 1 year per 1,000 births	167.9	164.3

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases, D, deaths, P, present]

Place		Sept 21–Oct 18, 1930	Oct. 19–Nov 15, 1930	Nov 16–Dec 13, 1930	Dec 14, 1930–Jan. 10, 1931	Week ended—											
						January, 1931			February, 1931				March, 1931				Apr. 4, 1931
						17	24	31	7	14	21	28	7	14	21	28	
Ceylon: Colombo	C													1			
China:																	
Canton	C	1	1														
Shanghai	C	38	2														
	D	4															
India	C	36,529	18,944	11,112	10,687	3,504	4,022	4,275	3,533								
	D	17,635	9,782	5,933	5,689	1,770	2,165	2,231	1,957								
Bombay	C	16	19	13		20	1										
	D	11	17	7		6	3										
Calcutta	C	24	33	22	28	36	29	24	32	27	33	45	65	80	102		
	D	15	16	16	20	25	19	19	23	22	25	26	39	49	68		
Karikal	C				1					4		1	4		1		
	D									4			4		1		
Madras	C	2	1		201	47	36	16		18	20	19	6				
	D	2			67	21	11	7	8	5	4	14	6	5			
Negapatam	D							1	2	1		2					
Rangoon	C	1			1												
	D	1			1	1											
Tuticorin	C	1	1	5	1	1					1						
	D	1	1														
India (French):																	
Chandernagor	C	3	1	1	2			1			1	2	2		2		
	D	1			3			1			1	3	1		3		
Pondicherry	C	1	1	4	31	9	4	3	3	10	20	31	39	29	25	26	
	D	1		4	21	3	3	3	2	10	9	6	9	6	5	4	
India (Portuguese)	C		14		1												
	D		9														
Indo-China (see also table below):																	
Pnompenh	C	2	1	2			1	2	1		3	3	3				
	D			2				2			1	2	2		1		
Saigon and Cholon	C	2	1	3	9	4	1		1			3	1	1		1	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931: 17	24	31	February, 1931: 7	14	21	28	March, 1931: 7	14	21	28	Apr. 4, 1931
Philippine Islands: [1]																	
Ports—																	
Iloilo	C	1		1	1			2									
	D	4		3	1			2									
Manila	C	5															
	D	1															
Provinces—																	
Antique	C	40															
	D	18															
Bulacan	C	2															
	D	1															
Capiz	C							3	56	69	54	28	35	29	11	4	4
	D							2	45	55	39	23	29	24	10	4	3
Iloilo	C	50	30	45	28	11	41	36	57	27	42	10	16	2	5		
	D	49	23	27	22	9	27	25	49	21	22	11	11	2	2		
Masbate	C													21			
	D													9			
Negros, Occidental	C	28	56	163	120	19	32	33	6	1	1	2					
	D	20	41	123	97	15	17	19	5	1	1	2					
Negros, Oriental	C								1								
	D								1								
Samar	C	7	16	6	17												
	D	7	12	8	9												
Sorsogon	C		5														
	D		4														
Surigao	C	(2)															
Siam	C	4	4	6	2	2		1			1					4	
	D	1	4	6	2	1										1	
Bangkok	C	3	3	4	2	2		1		1			1		1	1	
	D	2	2	4	2	1							1		1	1	

Place		August, 1930	September, 1930	October, 1930	November, 1930			December, 1930			January, 1931			February, 1931	
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20
Indo-China (French) (see also table above):															
Annam [3]	C	3													
Cambodia [3]	C	59	38	22	8	1	17	28				19	36		35
Cochin-China [3]	C	27	33	28	5	5	3	8				4	13		5

PLAGUE

Place		Sept. 21-Oct. 18, 1930	Oct. 19-Nov. 15, 1930	Nov. 16-Dec. 13, 1930	Dec. 14, 1930-Jan. 10, 1931	Week ended—											
						January, 1931			February, 1931				March, 1931				Apr. 4, 1931
						17	24	31	7	14	21	28	7	14	21	28	
Algeria:																	
Algiers	C	6	11	2	1	1		1		1							
	D		3														
Bone	C							1									
Constantine, vicinity of	C		1		50			1		1							
	D							1									
Oran	C	10	2														
	D	3	1														
Plague-infected rats		6	1														
Philippeville	C	3	2		1												
	D	1			1												
Argentina:																	
Cordoba Province	C						1				2						
Entre Rios Province—Diamante	C											2					
Jujuy Province—Palpala	C							1			1						
Santa Fe	C										2						
Belgian Congo	C		1	1											2		
	D		1	1											2		
British East Africa (see also table below):																	
Tanganyika	C			3	2							15	7				
	D			3	2							4					
Uganda	C	165	171	111	67	7	8	2	8	6							
	D	164	168	112	67	6	8	2	8	6							

[1] Figures for cholera in the Philippine Islands are subject to correction
[2] During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, P. I.
[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931: 17	24	31	February, 1931: 7	14	21	28	March, 1931: 7	14	21	28	Apr. 4, 1931
Ceylon: Colombo	C	3	1	9	8	1	1	1	5	6	2	1	2	1	3	3	
	D	3	1	8	9		1	1	4	7	2	1	3	1	3	2	
Plague-infected rats			1	2				1	1	1	1	1			3		
China:																	
Manchuria—Tungliau and Nungan	C	1															
Shensi	C		1														
Dutch East Indies:																	
Batavia and West Java	C	107	143	208	239	56	57	37	30	29							
	D	103	146	206	235	54	53	37	24	29							
East Java and Madura	C								4								
	D								4								
Java and Madura	D	335	501	557	615	142	102	98	85	89	100						
Egypt:																	
Alexandria	C	9	7	4	3				1				1				
	D	6	7	1													
Plague-infected rats				3	1		1				1						
Assiout	C		3	9	7	2	19	2	3	9		17	15	6	10	1	1
	D		1	1	1	2	2	2		4		3	4		4	1	1
Aswan	C			3													
Beni-Suef	C					1											
	D					1											
Cairo	C																1
Deirout	C						19	2		6	10						
	D						2	2			4						
Gharbieh	C							1									
	D							1									
Girga	C				7				1						14	37	35
	D				2				1						2	5	17
Kena	C															5	
	D															2	
Manfalut	C				23	5	21	4		11		2	2	3	5	9	
	D				5	2	3	1		4		1			2	1	
Minieh	C			1			1	1							2	1	
	D							1							1	1	
Port Said	C		2														

France: Marseille	C	4	4														
Greece (see also table below): Pyrgos	C	2															
India	C	2,371	2,721	3,259	3,740	1,169	1,279	1,438	1,449								
	D	1,068	1,497	1,856	2,226	837	737	937	891								
Bassein	C		1		2	1		1	2				1				
	D				1	1			2	1							
Bombay	C	2	1				1			1				1			
	D	2	1				1			1							
Plague-infected rats		64	30	32	38	10	6	9	9	14		8	10	17	14		
Madras Presidency	C	196	185	148	220	73	99	75	65								
	D	110	124	78	154	47	53	39	43								
Rangoon	C	2	2		2		2									1	
	D	2	1		1		1									1	
Plague-infected rats		1	1	4	2	2	1	1			8						
India (Portuguese)	C		3														
	D		3														
Indo-China (see also table below):																	
Pnompenh	C	2		6	1	1	3	2	1				1				
	D	3	1	6	1	1	3	2	1		1	2	1	2	1	1	
Saigon and Cholon	C	1															
Iraq: Baghdad	C	1	P	4			2	3				1	2	1	3	3	
	D	1		2			2	2					2		3	1	
Madagascar (see also table below): Tamatave	C	1	5	4	2		5	4									
	D	1	3														
Morocco	C		5		19	13											
	D				8	4											
Nigeria: Lagos	C	5	38	9	5				1								
	D	5	5	9	5				1								
Plague-infected rats		11	13	5	5												
Peru (see table below).																	
Senegal (see table below).																	
Siam	C	1	6						4	5			1	2			
	D		5						2	4				1			
Bangkok	C		1	1	3		4	4		1	2	3		29			
	D		1	1	3		4	3	1		1	4		6			
Nagara Rajsima	C	1	1	11	17	3	2	1	3	7							
	D	1	1	9	10	2	3	1	4	6							
Syria: Beirut	C		6		1				1		1						
Tripolitania	C		1	13		2	2	1	3		1			1			
	D			1		2			1								
Tunisia: Tunis	C		1	P	13	1					9	2	3		5		
	D										7						
Union of Socialist Soviet Republics:																	
Gouranduz	D							28									
Transcaucasia—Karabakh	C						6										
Union of South Africa.																	
Cape Province	C		1	P													
Orange Free State	C				2				P	P	1						
	D				2						1						
On vessel: S. S. Marionga de Thermiotis at Avonmouth	C				1												

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931
British East Africa (see also table above):							
Kenya	C	87	53	58	62	50	69
Greece (see also table above)	C			2			
Indo-China (see also table above)	C	2	5	2	5	1	
Madagascar (see also table above):							
Ambositra Province	C			4	44	95	
	D			4	44	87	
Antisirabe Province	C	11	21	3	18	27	
	D	11	21	3	18	26	
Miarinarivo Province	C	2	7	18	12	18	
	D	2	7	18	12	18	
Moramanga Province	C	27	18	20	19	13	
	D	27	17	20	19	11	
Tananarive Province	C	39	79	125	170	178	
	D	38	79	116	164	172	

Place		Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931
Peru	C	21	10	42	34	8	
	D	8	2	20	14		
Senegal.							
Baol [1]	C	79	48	53			
	D	20	23	35	4		
Dakar [1]	C	108	3				
	D	90	8				
Louga [1]	C	75	61	37	10		
	D	33	30	25	3		
Thies [1]	C	34	12	24	27	2	
	D	20	4	15	23	1	
Tivaouane [1]	C	110	20	53	31	2	
	D	54	14	31	25	1	

SMALLPOX

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Week ended— December, 1930		January, 1931					February, 1931				March, 1931			
					20	27	3	10	17	24	31	7	14	21	28	7	14	21	28
Algeria:																			
Algiers	C				1							1		1					
Bone	C										1								
Constantine	C		1																
Oran	C			3														1	
Arabia: Aden	C											1	1						
Belgian Congo	C						37	42	27	23									
Belgium	C												1						

Brazil:																			
Porto Alegre (alastrim)	C	26	28	36						3									
Rio de Janeiro	C		2																
British East Africa (see also table below):																			
Tanganyika	C	95	17	385	23	1	57	3	21	25	18	6	35	42					
	D	6	1	36	1		3		1	1	2	1		12					
British South Africa: Southern Rhodesia	C	153	95	18				18	2	1									
	D			3															
Canada:																			
Alberta	C	22		1			19			7			1						
British Columbia—Vancouver	C	2	3	1			1	2				2	1	2	5				
Manitoba	C										1				1				
Winnipeg	C							1							1				
Nova Scotia	C										1								
Ontario	C	19	59	23	1		8	8	10	3	32	4	10	4	7	8	2	3	
Kingston	C					2	4		1					1					
North Bay	C					1		1					1						
Ottawa	C		37	12			2		1	1	1			1					
Sault Ste. Marie	C							1	11	8	5	6			2				
Toronto	C			4													1		1
Quebec	C			2						2									
Saskatchewan	C	3	2	15					7	6	5	20	17	18	18	10	40	10	
Regina	C													1					2
China:																			
Canton	C												2			1	1	2	
Chungking	C	P	P	P	2														
Foochow	C	P	P	P				P		P		P		P		P			
Hong Kong	C					1				1			2	5		2			1
	D												1	1	1				2
Manchuria—																			
Harbin	C		1								1								
Kwantung—Dairen	C			4	1														2
	D			1															
Nanking	C	P	P	P	P	P	P	P	P		P	P	P	P	P	P			
Shanghai—																			
Foreigners only	C	1	2	8	4	2	6	2	1	1	6	4	4	7	2	3	3	1	1
Including natives	D		1	4	5	1	1	4	2	4	4	3	5	2	4	3	5	2	2
Swatow	D	4	3	3		2	1	2	1	1	3	2		3	3	7	3		6
Tientsin	C	1	1	2					1										
Chosen (see table below).																			
Colombia: Cali	D	2		1															
Dutch East Indies:																			
Java—Batavia and West Java	C	14	26	6	2		2			28		1					1		
	D	4	4	2		1	1			1		1	1						
Sanggi Islands	C		29																
	D		3																
France (see table below).																			

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Week ended— December, 1930		January, 1931					February, 1931				March, 1931			
					20	27	3	10	17	24	31	7	14	21	28	7	14	21	28
Great Britain:																			
England and Wales	C	325	372	508	138	135	164	228	187	272	286	213	221	250	247	227	171		
Bradford	C	1	1	1			1			1		3		1					
Cardiff	C	1																	
Leeds	C	1	2				2												
London	C	29	172	184	27	38	48	48	45	47	33	24	23	16	23	36	26		
London and Great Towns	C	52	296	433	105	131	162	162	154	198	194	147	150	186	189	158	117		
	D		1	1										1					
Sheffield	C									1	1	1		16	6	10	2		
Stoke-on-Trent	C		1							1						1			
Greece (see table below).																			
Honduras:																			
Amapala	C															1			
Ocotopeque and Gracias districts	C															P			
Puerto Castilla	C							4	7	1		3	3						
India	C	2,322	2,412	3,627	942	1,169	1,278	2,234	2,068	2,396	2,477	2,682							
	D	572	606	874	262	281	327	510	497	486	523	739							
Bombay	C	1		1			1	1	2	2	2	1		1	3	2	4	1	
	D			1			1	1			1			1	1	1		1	
Calcutta	C	12	9	18	10	19	15	15	28	28	40	47	35	51	83	82	53	69	
	D	11	7	11	7	13	10	10	16	22	29	33	26	41	66	55	36	54	
Cochin	C	12	25	22	6	7		2	5	6	8	10	19		16	24	15	17	
	D	1	3	4				1					1		1	1			
Karachi	C			3							2	1			4			3	
	D			1							1	1							
Madras	C	19	9	20		1		3	4	7	3	2	4	1	3	1	6	3	
	D	8	2	3										1				2	
Moulmein	C									2									
Negapatam	C	14	9	6															
Rangoon	C	2	1	1									2		1	1	1	1	
	D		1														1		
Tuticorin	C	1																	
Vizagapatam	C	1										1			8		1		
	D														2				

India (French):																			
Chandernagor	C	3	3			5			3	2	1	3	2		6	6		3	
	D	1	1			2	1		1						1				
Karikal	C	1					1	2	1	2		2	2		16	1			
	D	1						2		2		2	2		16				
Pondicherry Province	C	38	11	19	8	8	7	11	16	8	13	8	1	1	10	7			
	D	36	11	17	7	8	7	10	16	8	13	8	1	1	10	7			
India (Portuguese)	C				3			1	1	4			2	3					
Indo-China (see also table below):																			
Pnompenh	C	2		1		2						1					1		
	D			1								1							
Saigon and Cholon	C		2	2					3	1		2		2	2		1		1
	D		2	2					2			2			1		3	1	2
Iraq:																			
Baghdad	C	2													8	6			
Mosul Liwa	C	69	6	16				1		2		1		5					
	D	27		2										1					
Ivory Coast (see table below).																			
Japan:																			
Kobe	C														1	1			
Taiwan	C											1							
Mexico (see also table below):																			
Jalisco (State)—Guadalajara	D	3	3	3						1									1
Juarez	D	1	1																
Mexico City and surrounding territory	C	13	9	6	1	5	4						7	5		11	13		
	D	3	2	6	2	1	3					1	1	3	2	2	5		
Vera Cruz	C		1										1		1	1		1	
Morocco (see table below).																			
Nicaragua: Porto Cabezas	C				2														
Nigeria: Lagos	C																		2
Panama Canal Zone	C										2								
Poland	C		8	3			23	2						1					
Portugal: Lisbon	C	16	20	37	21	17		34	27	31	15	30		12	19	9	16	15	
Siam	C	1						1	1		1	1	1	1					
Somaliland, British: Boales	C	1	1	1															
	D	1						1											
Spain	C		51	67	19	31	18				10	8	10	4	10	46	45		
Straits Settlements	C	5	10	17	3		2	1	3	1	2	1			2				2
	D	1	2	7	2		1				1				1				1
Sudan (Anglo-Egyptian)	C	82	5	50		47		17	1	7		3	1	1	44	51	3	1	4
	D	7	1	5		5		1		7					6	4		1	1
Sudan (French) (see table below).																			
Switzerland: Berne Canton	C	1																	
Syria (see table below).																			
Tunisia: Tunis	C	2					13	4	6	1	1								
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P	P	P	P				P							
Orange Free State	C		2	P								P							
Transvaal	C	P	P	P	P	P	P		P	P	P	P	P	P					
Upper Volta	C			6				4						8	10				
	D							2											

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates case; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Week ended— December, 1930		January, 1931					February, 1931				March, 1931			
					20	27	3	10	17	24	31	7	14	21	28	7	14	21	28
On vessel:																			
S. S. Clan Mactoggart at Suez	C												2						
S. S. Muncaster Castle at Manila from Hong Kong	C					1													
S. S. Matheran at Suez from Calcutta	C									1									
S. S. Clan Buchanan at Suez	C														2				

Place		August, 1930	September, 1930	October, 1930	November, 1930			December, 1930			January, 1931			February, 1931	
					1–10	11–20	21–30	1–10	11–20	21–31	1–10	11–20	21–31	1–10	11–20
Indo-China (see also table above)	C	93	192	258		86		38	9	14		48	46		46
Ivory Coast	C			4		2		9							
Sudan (French)	C	39	P	17				43		96					
	D	3		2				16		4					
Syria: Beirut	C	1										1			

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
British East Africa (see also table above): Kenya	C	186		424		653		Greece	C	1	6				4
Chosen	C	65	35	3	22			Mexico (see also table above)	D	659	718	822	893		1
	D	21	15	5	6			Morocco	C	3	8	4	4	20	
France	C	1						Turkey	C	51	21	19	74		
									D	13	4	2	1		

TYPHUS FEVER

Place		Sept. 21-Oct. 18, 1930	Oct. 19-Nov. 15, 1930	Nov. 16-Dec. 13, 1930	Week ended— December, 1930		January, 1931					February, 1931				March, 1931			
					20	27	3	10	17	24	31	7	14	21	28	7	14	21	28
Algeria:																			
Algiers	C		1	2									1	1					
Constantine Department	C	2	1	2			3	3		6	6	19			4			1	
Oran	C	3		5						1	2					1			
Bulgaria	C	6	3	11	3				9	2	1	1		2		3			
	D				1														
Chile: Valparaiso	D																	1	
China:																			
Canton	C									2									
Manchuria—Harbin (see also table below)	C	1		1						3									
Shanghai	C									2									
Tientsin	C			1															
Chosen (see table below).																			
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C	1	2	2															
	D		2																
Beheira Province	C				1														
	D				1														
Cairo	C			1	1							1							
Port Said	C	1	2							1									
Eritrea: Asmara	C																1		
Great Britain: Scotland	C											1							
Glasgow	C										2								
	D										1								
Guatemala.[1]																			
Iraq: Baghdad	C												2	1	1	1	1		
	D												1						
Latvia (see table below)																			
Lithuania (see table below).																			
Mexico (see also table below):																			
Durango	D	2									1								
Mexico City, including municipalities in Federal District	C	8	11	14	5	2	4	1	13	12	6	8	13	13	9		46		
	D	2	4	7	4	1	3	2	8	9	9	8	4	7	5		20		
San Luis Potosi	D			2									2	2		1	1	1	2

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reports an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Week ended— December, 1930		January, 1931					February, 1931				March, 1931			
					20	27	3	10	17	24	31	7	14	21	28	7	14	21	28
Morocco	C		3	1	8					5	6	2	7	8	5	8	2	2	
	D	1								2				1					
Palestine	C	3	3	7	1	1		2	1	1			3				2	1	1
Paraguay: Asuncion	D									2	2								
Poland	C	22	37	42	18	6	28	11	19	21	16	50	49	41	43	56	62	58	
	D	2		7	3				2	1	4	1	3	3	4	9	4		
Portugal: Oporto	C	2	4	6						1									
Rumania	C	14	41	34	20	34		59	54	43	51	45	49	53	12				
	D		2	3	1	2		2	1	7	6	2	5	11	3				
Spain	C	2	4	1															
	D	2		1															
Tunisia	C	12		28						7	4	5			6	12	5	2	
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P	P					
Municipality of East London	C	1	1	1	P		2	1		1	1	1							
Natal	C	2	P					P	P	P	P	P	P	P					
Orange Free State	C		P		P	P		P	P	P	P	P	P						
Transvaal	C	P	P	P	P	P	P	P	P	P	P	P	P	P					
Yugoslavia (see table below).																			

Place		Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931
China: Harbin (see also table above)	C	5		3			
Chosen: Seoul	C	2	1	7	1	1	1
Czechoslovakia	C	1			16	16	60
Greece: Athens	C	6	4	4	4	10	10
Latvia	C	1	2				
Lithuania	C	7	24	1	5	6	26
	D	1	2		1	3	3
Mexico (see also table above)	D	26	47	47			
Turkey	C	11		28	3	2	
Yugoslavia	C	2		2	2		20
	D	1		1			2

YELLOW FEVER

	Cases	Deaths
Brazil:		
Bahia State—Mar. 14, 1931	1	
Ceara State—Mar. 14, 1931	2	
Barbalha, Feb. 7, 1931	1	1
Minas Geraes State, Mar. 20, 1931	2	
Rio de Janeiro State—		
Mar. 7, 1931	1	1
Mar. 21, 1931	1	1
Cambucy—		
Jan. 1-25, 1931	3	3
Feb. 1-7, 1931	1	1
Brazil—Continued.		
Rio de Janeiro State—Continued.		
Friburgo (imported), Jan. 25-30, 1931	1	
Padua—		
Jan. 18-24, 1931	1	1
Feb. 1-7, 1931	1	1
Gold Coast:		
July 10, 1930	1	
Albosso, Aug. 4, 1930		1

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Positive Wassermann and Kahn Reactions in Leprosy
The County Health Unit of Yesterday and To-day

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HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

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SIGNIFICANCE OF POSITIVE WASSERMANN AND KAHN REACTIONS IN LEPROSY[1]

By L. F. BADGER, *Passed Assistant Surgeon, United States Public Health Service, Leprosy Investigation Station, Honolulu, T. H.*

In dealing with leprosy one frequently is confronted with the question whether a given case has syphilis as a complication. The diagnosis of syphilis in nonlepers is not always simple, but in lepers it is in many instances extremely difficult. The history obtained in many cases is unreliable; and due to the similarity of some of the manifestations of the two diseases, the diagnosis on clinical findings alone may be impossible. What significance, then, can be placed upon the usual serological tests?

Cooke (1) (1919) summarized the work of 42 investigators, reporting from 1908 to 1916, on 1,397 cases of leprosy. Fifty and four-tenths per cent were reported as giving a positive Wassermann reaction. From the summary he concluded that positive Wassermann reactions may occur with the sera of lepers free from syphilis.

Hasseltine (2) (1924) summarized numerous reports on the subject covering the period from 1908 to 1919. He reviewed the reports on 214 cases not included in Cooke's summary. From his review he believed there was ample foundation for the assumption that serum from cases of leprosy may give a positive Wassermann reaction even though syphilis is absent.

A review of the more recent literature on the subject shows that there is still a marked disagreement in the results obtained and the conclusions arrived at by various investigators.

Iyengar (3) (1919) reported the Wassermann test to be positive in 41 per cent of 100 undoubted male lepers from 25 to 60 years of age and 22 per cent of 400 unselected Indian males of the same ages not suffering from leprosy.

Lie (4) (1920) found the Wassermann test to be positive in most cases of nodular leprosy and in some cases of the anesthetic type.

Goodpasture (5) (1923) obtained a positive Wassermann test in 60 per cent of untreated cases of nodular and mixed leprosy.

Lloyd, Muir, and Mitra (6) (1923) found 41.7 per cent of 228 adult lepers and 62 per cent of 58 leper children to give positive Wassermann tests.

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[1] Submitted for publication Oct. 1, 1929.

Leao (7) (1923) obtained positive results in 50 per cent of his cases tested with an antigen of luetic liver; 32 per cent with cholesterinized human and ox-heart antigens, and 14 per cent with an acetone insoluble antigen.

Yagle and Kolmer (8) (1923) tested the sera of 28 cases of leprosy. From the results obtained they concluded that the Kahn precipitation reaction is uniformly negative with the sera of nonsyphilitic lepers.

Kolmer and Denney (9) (1923) examined the sera of 159 cases of leprosy and concluded that "In so far as the new complement fixation reaction is concerned, we have no hesitation in stating that in leprosy itself falsely positive reactions do not occur."

Lewis and Aronson (10) (1923) examined the sera of 44 cases of leprosy and 134 nonlepers. With a cholesterinated antigen they obtained 55.9 per cent of the former and 24.3 per cent of the latter positive; with an acetone insoluble antigen they found the percentages of positives to be 63.6 and 18.7 respectively. They tested the complement fixing power of serum of lepers and nonlepers with an alcoholic extract of *Bacillus tuberculosis* as an antigen; 93.3 per cent of 44 lepers and 68.4 per cent of 134 nonlepers gave positive results. In a previous study (11), using the same antigen they obtained but 71 per cent of positive reactions in frank cases of tuberculosis. They conclude that since sera of lepers give such a high percentage of positive reactions with antigens ordinarily used for the Wassermann reaction and with the tuberculosis antigen these reactions can not be interpreted as being indicative of a superimposed or underlying infection with syphilis or tuberculosis.

Lloyd, Muir, and Mitra (12) (1924) concluded from their investigation that syphilis is an important complicating factor in both types of leprosy.

Hasseltine (2) (1924) testing the sera of 236 lepers obtained positive results in 17.8 per cent with an acetone insoluble antigen; 50 per cent with cholesterinated antigen and 21.6 per cent with Kolmer's antigen. He concluded that there is apparently a tendency to the formation of some reagin in the sera of lepers that will fix complement in the presence of the usual Wassermann antigens.

Sechi (13) (1925) found the Wassermann test positive in 10 of 11 sera of lepers tested.

Simon (14) (1925) tested the sera of 24 cases of leprosy by the Wassermann test and found 23 positive, 15 strongly so. He concluded that the Wassermann reaction is positive in leprosy.

Pineda and Roxas-Pineda (15) (1926) after testing 500 cases of leprosy concluded substantially as follows: (1) With refined methods the Wassermann reaction is negative in uncomplicated cases of leprosy in its ordinary form. (2) When the Wassermann reaction is clearly

positive in cases of ordinary leprosy it has the same significance as in nonlepers. (3) In a certain proportion of cases of leprosy reactions without evidence or presumption of syphilis, weakly positive reactions are obtained.

Arguilles (16) (1926) found a very close agreement in the Wassermann and Kahn tests, with the latter slightly more sensitive. He stated that the Wassermann and Kahn tests in leprosy are generally negative.

Pineda and Roxas-Pineda (17) (1926) after the examination of 222 cases of leprosy concluded that the Kahn test is negative in uncomplicated leprosy and gives no doubtfully positive reactions in cases suffering from leprous reactions.

Lloyd, Muir, and Mitra (18) (1926) found 31.2 per cent of 1,027 cases of leprosy to give positive Wassermann reactions. They found 50 per cent of 28 leper children, 48.5 per cent of 249 (majority advanced skin leprosy) and 25 per cent of 754 mild cases to give positive Wassermann tests.

Otero (19) (1927) after testing the sera of 42 lepers with the Wassermann, Kolmer, and Kahn tests, concluded that some uncomplicated cases of leprosy do give positive reactions, especially during febrile reactions.

Vilanova and Catories (20) (1927) concluded from their studies that sera of leper patients possess the power of fixing complement in the presence of various antigens.

Girard and Robie (21) (1928) concluded that the Meinicke test gave positive reactions in a certain number of syphilis-free lepers.

Lai (22) (1928) after testing the sera of 167 lepers, concluded that "The Kahn reaction is generally negative in leprosy without the coexistence of syphilis."

Greval (23) (1928) found the Kahn, Micro-Kahn, and the Wassermann tests with the sera of 112 lepers and an equal number of syphilitic suspects to give almost identical results in the two series of cases.

Silveria and Gomes (24) (1929) obtained positive Wassermann and Kahn reactions in patients showing, clinically, signs of leprosy without those of other diseases such as syphilis.

From the above summaries one may conclude that the results of most of the studies indicate that there is a reagin in the sera of some lepers that will fix complement in the presence of the Wassermann and Kahn antigens.

PRESENT OBSERVATIONS

There frequently occur positive reactions with the sera of patients under treatment for leprosy at Kalihi Hospital in whose history there is no indication of syphilis nor are there noted clinical findings of that disease.

The present study was undertaken to obtain, if possible, further evidence as to the significance of positive serum reactions in leprosy. The Wassermann [2] and Kahn [2] tests are made with the sera of all patients entering the hospital, and this report is based on the findings of these tests with the sera of 207 patients over 10 years of age.

The antigens employed were Kolmer's antigen for the Wassermann tests and Kahn's antigen for the Kahn test. A reading of three plus or more with 0.1 or 0.05 cubic centimeters of serum was considered a positive Wassermann test, and an average of three plus with 0.05, 0.025, and 0.0125 cubic centimeters of the antigen a positive Kahn test.

A positive Wassermann test was observed with the sera of 42, or 20.2 per cent; a positive Kahn test with the sera of 57, or 27.5 per cent, and one or both tests were found positive with the sera of 60, or 28.9 per cent.

There occur, as will be discussed later, changes in the results of the tests during the course of the disease. With the tests repeated one to three times on but 56 of the 207 patients, the percentage of patients whose sera gave positive reactions at one or more tests increased from 28.9 per cent to 34.8 per cent. None of the cases retested had received antisyphilitic therapy in any form.

TABLE 1.—*The age and sex incidence of persons having either positive Wassermann or Kahn reactions, or both, among 207 lepers studied*

Age group	Male			Female			Total		
	Number examined	Number positive	Per cent positive	Number examined	Number positive	Per cent positive	Number examined	Number positive	Per cent positive
10–19	33	10	30.3	25	11	44.0	58	21	36.2
20–29	44	11	25.0	23	9	39.1	67	20	29.8
30–39	27	4	14.8	12	6	50.0	39	10	25.6
40+	30	6	20.0	13	3	23.0	43	9	20.9
Total	134	31	23.1	73	29	39.7	207	60	28.9
10–19	33	10	30.3	25	11	44.0	58	21	36.2
20+	101	21	20.7	48	18	37.5	149	39	26.1

TABLE 2.—*The age and sex incidence of persons having positive Wassermann reactions, and of those having a positive Kahn reaction, among 207 lepers studied*

Age group	Male					Female					Total				
	Wassermann			Kahn		Wassermann			Kahn		Wassermann			Kahn	
	Number examined	Number positive	Per cent positive	Number positive	Per cent positive	Number examined	Number positive	Per cent positive	Number positive	Per cent positive	Number examined	Number positive	Per cent positive	Number positive	Per cent positive
10–19	33	6	18.1	8	24.2	25	8	32.0	8	32.0	58	14	24.1	16	27.5
20–29	44	5	11.3	11	25.0	23	9	39.1	11	47.8	67	14	20.8	22	32.8
30–39	27	2	7.4	4	14.8	12	3	25.0	6	50.0	39	5	12.8	10	25.6
40+	30	6	20.0	6	20.0	13	3	23.0	3	23.0	43	9	20.9	9	20.9
Total	134	19	14.1	29	21.6	73	23	31.5	28	38.8	207	42	20.2	57	27.5

[2] The Wassermann and Kahn tests were performed in the laboratory of the Queens Hospital, Honolulu.

In studying the relation of these tests to sex it will be observed (Tables 1 and 2) that positive results were obtained nearly twice as frequently in the females as in the males. Positive tests occurred in 39.7 per cent of the females and 23.1 per cent of the males. The same variation between the sexes is also noted when each test is considered separately, and with the exception of the patients over 40 years of age the variation is noted in each of the age groups.

It will also be noted from the study of Tables 1 and 2 that positive reactions occur more frequently in the patients under 20 than in those over 20 years of age, the percentage being 36.2 and 26.1, respectively. The lowest incidence falls in the age group 40 years or over and the highest in the 10 to 20 age group.

A study of these tests in relation to the types of leprosy was attempted. Such a study is difficult, since we have at our command no satisfactory classification of leprosy, as to types. It is rare, if ever, in Hawaii at least, that one sees a case of leprosy which does not show both neural and dermal manifestations. For the purpose of this study those cases in which the dermal manifestations predominate are classed as dermal and those in which the predominating manifestations are the result of nerve involvement are classed as neural. No variation in the serum reactions in the two classes was noted.

Likewise no variation was noted when the cases were classified by microscopic examination as positive and negative.

A comparison of these results with those of a recent analysis made at a local general hospital showed positive Wassermann and Kahn tests to be approximately three times as frequent among lepers as among nonlepers. One hundred and twenty-one, or 9.9 per cent, of the sera of 1,212 hospital cases, not including any cases of leprosy, gave positive reactions, in contrast with 60, or 28.9 per cent, of the sera of 207 cases of leprosy.

Either a positive Wassermann or a positive Kahn test with the sera of lepers has been regarded by some observers as signifying the presence of a syphilitic infection. If this were correct, there should occur a close agreement in the two tests. In the initial determinations with the sera of the 207 patients, both tests were negative in 146 and positive in 40, an agreement of 89.8 per cent and a disagreement of 10.1 per cent. However, a further analysis of the results shows that 31 per cent of the sera that gave a positive Kahn reaction gave a negative Wassermann reaction—a rather marked disagreement.

Although an incidence of syphilis of 34.8 per cent is considered high, it may be argued that, as leprosy most frequently occurs among individuals of a low social and economic status, the incidence of syphilis in such a group would also be high. As stated above, the results of this study have been compared with the results of a

group of patients in a general hospital. Both groups are comparable in social and economic status, as well as in racial origin. The tests on both groups were performed by the same laboratorian employing the same antigens and technique. The incidence of positive serum reaction in the leper group was found to be more than three times that in the control group.

If a positive Wassermann or Kahn test obtained with the sera of lepers signifies the presence of an infection with the *Treponema pallidum*, then one may conclude that—

1. One in three of the patients studied is afflicted with both leprosy and syphilis;
2. Syphilis occurs three times as frequently in the leper group as in the control group;
3. Syphilis occurs almost twice as frequently among the female as among the male patients; and
4. The incidence of syphilis is greater in the patients under than in those over 20 years of age.

Experience with syphilis renders such conclusions highly improbable, and one is forced to interpret these observations as suggesting that a positive Wassermann or a positive Kahn reaction does not necessarily signify the presence of a complicating syphilitic infection.

If a positive serum reaction is produced by some reagin in the serum of individuals with leprosy other than those, whatever their nature, in the serum of syphilitics, evidence of such should be obtained by withholding antisyphilitic therapy and observing the changes in the clinical manifestations of the leprosy and retesting the serum at intervals. Such a procedure has been followed in this study.

Definite changes have been noted in the serum reactions accompanying alterations in the clinical manifestations of leprosy when the sera have been retested after intervals of varying length. These changes occurred in both the Wassermann and Kahn tests and consisted of a negative serum becoming positive, a positive serum becoming negative, or by either an increase or a decrease in the degree of reaction. The changes in the two tests were not always comparable, as shown by the fact that Wassermann tests have become negative or decreased in degree, while the Kahn reaction remains unchanged. In some instances both decreased in degree or became negative, and in others the clinical changes were accompanied by an increase in the degree of the Kahn, even to a strongly positive, while the Wassermann remained negative. In others clinical changes were accompanied by an increase in the reaction of both tests. In no instance did there occur an increase in the degree of the Wassermann without an increase in the Kahn, except in those cases where the Kahn was four plus at the previous test.

The changes noted in the serum reactions are tabulated in Tables 3, 4, 5, and 6. A few of the cases are described in more detail.

TABLE 3.—*The results of the retesting of sera which gave a positive Wassermann reaction on the first test (no antisyphilitic therapy)*

Case	Date	Wassermann reaction—Amount of serum		Remarks
		0.1 c.c.	0.05 c.c.	
2748	July, 1927	1	3	On admission.
	September, 1928	0	0	Marked improvement following reaction.
	June, 1929	0	0	Continued improvement.
2828	April, 1928	2	3	On admission.
	January, 1929	1	3	Definite improvement.
	April, 1929	0	0	Slow but continued improvement.
	July, 1929	0	0	Do.
2857	August, 1928	4	4	On admission.
	January, 1929	2	3	Slow but definite improvement.
	July, 1929	2	2	Continued improvement
2838	August, 1928	1	3	Three months after admission.
	February, 1929	0	0	Marked improvement.
	July, 1929	0	0	Continued slow improvement.
2837	July, 1928	4	4	On admission.
	October, 1928	1	1	Marked improvement.
	March, 1929	1	2	Stationary.
	July, 1929	3	4	Do.
2598	November, 1925	4	4	On admission.
	August, 1928	0	0	Clinically quiescent.
	July, 1929	0	0	Do
2827	May, 1928	4	4	On admission.
	October, 1928	0	0	Marked improvement.
	July, 1929	0	0	Clinically quiescent.
2830	April, 1928	4	4	On admission
	February, 1929	3	4	Slight improvement.
	July, 1929	2	2	Definite improvement following reaction.

TABLE 4.—*The results of retesting of sera which gave a negative Wassermann reaction on the first test*

Case	Date	Wassermann reaction—Amount of serum		Remarks
		0.1 c.c.	0.05 c.c.	
2875	October, 1928	0	0	On admission.
	January, 1929	0	3	Sub-acute reaction.
	June, 1929	3	4	Acute leprous reaction.
2245	February, 1923	0	0	On admission
	August, 1928	0	0	Moderate nodulation
	March, 1929	0	0	Increased nodulation
	July, 1929	1	3	Marked nodulation.
2755	September, 1927	0	0	Quiescent
	March, 1929	2	1	During reaction
	July, 1929	2	0	Convalescing from reaction.
2116	August, 1923	0	0	Slight nodular involvement.
	April, 1924	0	0	Do.
	August, 1928	1	3	Marked and heavy nodulation.
	July, 1929	3	4	Marked and heavy nodulation and colliquation.
2850	August, 1928	0	0	On admission
	February, 1929	4	3	Slight improvement
	July, 1929	3	3	Marked decrease in infiltration.
2852	August, 1928	0	0	On admission
	January, 1929	0	2	Slight improvement.
	July, 1929	3	4	Marked decrease in infiltration.
2874	October, 1928	0	1	On admission
	January, 1929	3	4	Definite decrease in infiltration
	July, 1929	3	3	Marked decrease in infiltration since admission.

TABLE 5.—*The results of retesting sera which gave a positive Kahn reaction on the first examination (no antisyphilitic therapy)*

Case	Date	Kahn reaction—Dilutions of antigen			Remarks
		0.05 c.c.	0.025 c.c.	0.0125 c.c.	
2748	July, 1927	3	3	3	On admission.
	September, 1928	0	0	0	Marked improvement following reaction.
	June, 1929	4	4	4	Slow steady retrogression; developing new hard papular lesions.
2855	August, 1928	3	3	3	On admission.
	January, 1929	1	1	1	Marked improvement.
	July, 1929	0	0	0	Slow but continued improvement.
2874	October, 1928	3	3	4	On admission.
	January, 1929	2	2	3	Definite decrease in infiltration.
	July, 1929	1	2	3	Marked decrease in infiltration since admission.
2827	May, 1928	4	4	4	On admission.
	October, 1928	0	0	0	Marked improvement; skin quiescent; paroled July, 1929.

TABLE 6.—*The results of retesting of sera which gave negative Kahn reactions on the first examination*

Case	Date	Kahn reaction—Dilutions of antigen			Remarks
		0.05 c.c.	0.025 c.c.	0.0125 c.c.	
2712	March, 1927	0	0	0	On admission.
	June, 1929	0	1	3	During acute leprous reaction.
2749	July, 1927	0	0	0	On admission.
	November, 1927	0	0	0	Clinically stationary.
	July, 1929	1	3	3	Marked retrogression; became markedly nodular.
2875	October, 1928	1	2	3	On admission.
	July, 1929	4	4	4	During acute reaction.
2831	May, 1928	0	0	0	On admission.
	September, 1928	0	0	0	Definite improvement since admission.
	February, 1929	2	3	4	Reactivation of lesions; leprous reaction.
	July, 1929	0	0	0	No active lesions.
2829	April, 1928	0	0	0	On admission.
	February, 1929	2	2	4	Slow but definite retrogression.
	July, 1929	2	3	4	Marked increase in nodulation since admission.
2116	August, 1923	0	0	0	Slight nodulation.
	April, 1924	0	0	0	Do.
	August, 1928	4	4	4	Marked nodulation.
	February, 1929	4	4	4	Marked nodulation; nodules breaking down and ulcerating.
	July, 1929	4	4	4	Marked nodulation, nodules breaking down and ulcerating.
2505	August, 1928	1	2	4	Admitted February, 1925; progressed since admission.
	July, 1929	2	3	4	Marked increase in infiltration.
2793	November, 1927	1	1	1	On admission.
	September, 1928	1	2	3	Nodules breaking down and ulcerating.
	February, 1929	3	3	4	Marked breaking down and ulceration of lesions.
	July, 1929	3	3	4	Do.

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Case 2598 (Table 3).—On admission: Erythematous infiltration of ears, face, neck, and legs; erythematous macules over the buttocks and thighs. Hands and feet edematous and cyanotic. Soon after admission, Wassermann four plus. Three years later: Clinically quiescent, Wassermann negative. Four years after admission: Clinically quiescent, Wassermann negative. (Change: From strongly positive to negative Wassermann.)

Case 2827 (Tables 3 and 5).—On admission: Erythematous edematous macules over face, arms, hands, trunk, buttocks, and legs. Wassermann and Kahn positive. After 5 months, marked improvement, but slight erythema and no edema of lesions; Wassermann and Kahn negative. Fourteen months after admission: Clinically arrested; paroled; Wassermann and Kahn negative. (Change: From strongly positive to negative Wassermann and Kahn.)

Case 2828 (Table 3).—On admission: Marked infiltration of entire face and ears, cheeks and ears nodular; upper and lower extremities infiltrated and nodular; edema and cyanosis of hands and feet; Wassermann 2 and 3 plus; Kahn 4 plus. After 9 months of moderate improvement: Wassermann 1 and 3 plus, Kahn 4 plus. After 12 months of steady moderate improvement: Wassermann negative, Kahn 4 plus. After 15 months of steady improvement: Wassermann negative, Kahn 4 plus. (Change: From weakly positive Wassermann and strongly positive Kahn to weaker Wassermann and strongly positive Kahn, to negative Wassermann and strongly positive Kahn.)

Case 2875 (Tables 4 and 6).—On admission: Bacteriologically positive, nodulation and infiltration of ears, face, and extremities; marked edema and cyanosis of hands and feet; Wassermann negative, Kahn weakly positive. Three months after admission, during a subacute reaction: Wassermann and Kahn both weakly positive. Eight months after admission, during "acute leprous fever": Wassermann and Kahn strongly positive. (Change: From negative Wassermann and weakly positive Kahn to weakly positive Wassermann and Kahn to strongly positive Wassermann and Kahn.)

Case 2855 (Table 5).—On admission: Marked erythematous infiltration and nodulation of ears, face, neck, trunk, and extremities; hands and feet edematous and cyanotic; Wassermann negative, Kahn positive. After 5 months of marked improvement: Wassermann negative and Kahn 1 plus. After 5 months of marked improvement and 7 months of continued steady improvement: Wassermann and Kahn negative. (Change: From negative Wassermann and positive Kahn to negative Wassermann and Kahn.)

Case 2829 (Table 6).—On admission: Marked erythematous infiltration and nodulation of ears, face, and extremities; Wassermann and Kahn negative. After 15 months of steady retrogression: Wassermann negative, Kahn positive. (Change: From negative Wassermann and Kahn to negative Wassermann and positive Kahn.)

There were noted changes in the serum reaction which suggest that there occur, in some cases, substances in the serum resulting from marked and rapid degeneration of the lesions of leprosy which produce positive serum tests.

Case 2116 (Tables 4 and 6).—On admission: Age, 6 years; moderate nodulation of ears, face, and extremities; Wassermann and Kahn negative. At age of 12: Marked nodulation and some degeneration of lesions; Wassermann, 1 and 3 plus. Eleven months later: Marked nodulation and degeneration; Wassermann, 3 and 4 plus; Kahn, 4 plus. (Change: From negative Wassermann and Kahn to strongly positive Wassermann and Kahn.)

Case 2793 (Table 6).—On admission: Marked nodulation; severe edema of legs and feet; moderate ulceration of feet. After 5 months: Some improvement and increase in degeneration and ulceration of lesions. (Change: Increase in degree of Kahn reaction.)

From a study of the tables and the foregoing case reports it will be seen that definite changes in the clinical manifestations of leprosy may be accompanied by correlated changes in the serum reactions. A marked clinical improvement in a patient whose serum gives a positive serological test may be accompanied by a change from a posi-

tive to a negative serum reaction. A slow but steady clinical improvement may be accompanied by a gradual diminution in the degree of the serum reaction before it becomes negative. Subacute or acute leprous reactions may be accompanied by changes in the serum reactions from negative to weakly or strongly positive. There also may occur a change from negative to a positive reaction with the sera of patients whose lesions are undergoing rapid and extensive degeneration (ulceration or colliquation). In cases where there occurs a fluctuation clinically, the degree of serum reactions may also fluctuate.

The Wassermann test has been performed with the sera of 220[8] lepers, 42 of which resulted in positive and 178 in negative readings. Retesting of 18 of the positives who had received no antisyphilitic therapy and 23 of the negatives resulted in changes in the reaction in 16, or 39 per cent. Of the positive sera, 9, or 50 per cent, showed changes in the degree of reaction, 5, or 26.6 per cent, becoming negative. Of the negative sera, 7, or 30.4 per cent, showed changes in the degree of reaction, 5, or 21.7 per cent, becoming positive.

The Kahn test was performed on 207 lepers, 57 of which resulted in positive and 150 in negative readings. Retesting of 25 of the positives and 16 of the negatives who had received no antisyphilitic therapy resulted in changes in 19, or 46.3 per cent. Eight, or 32 per cent, of the positives and 11, or 68.7 per cent, of the negatives showed changes in degree of reaction, 6, or 37.5 per cent, of the negatives becoming positive. The Kahn test is apparently more sensitive with the sera of lepers than is the Wassermann. A higher percentage of the sera gave a positive Kahn reaction, and clinical changes are more frequently accompanied by changes in the Kahn than in the Wassermann tests.

THE QUANTITATIVE KAHN TEST

A quantitative Kahn test was determined on 33 leprosy patients whose sera gave a strongly positive Kahn reaction. In a total of 52 determinations the number of units varied from 4 to 20,000, with 32, or 61.5 per cent, over 1,000. In the local general hospital, where similar determinations were made by the same laboratorian, it was rare to find a reading of over 1,000 units. The hospital cases may be used as a control. A comparison of the two groups suggests that the sera of lepers giving a strongly positive Kahn reaction may contain an unusually high number of Kahn units.

By determination of the number of Kahn units at intervals of varying duration, a relation of the results with the clinical progress of the leprosy was noted. There occurred a reduction in the number of units with clinical improvement and an increase with clinical retrogression. None of the patients retested had received anti-

[8] Including 13 cases on whose sera the Kahn test was not performed.

syphilitic therapy in any form. The results of the quantitative Kahn determinations are tabulated in Table 7.

TABLE 7.—*Results of quantitative Kahn determinations*

Case	Date	Kahn units	Remarks
2879		4	
2755		4	
2887		40	
2890		40	
2869		40	
2864		110	
2867		200	
2905		280	
2910		400	
2904		400	
2900		800	
2924		800	
2920		2,000	
2839		2,000	
2738		4,000	
2929		4,000	
2889		6,400	
2893	February, 1929	10,000	On admission.
	June, 1929	4,000	Definite improvement.
2828	January, 1929	3,960	Nodular
	July, 1929	4,000	No change since previous test.
2857	January, 1929	7,600	Nodular
	July, 1929	2,000	Marked improvement during 6 months.
2245	March, 1929	2,000	Nodular
	July, 1929	1,600	Stationary clinically
2863	January, 1929	480	Nodular, marked improvement over 5 months' period.
	March, 1929	400	Stationary
	July, 1929	2,800	Retrogression, new lesions
2858	January, 1929	9,600	Marked edema; moderate infiltration.
	July, 1929	10,000	Stationary to improvement
2838	February, 1929	8,400	Nodular, definite improvement over 9 months.
	July, 1929	2,000	Marked improvement.
2837	March, 1929	2,000	Nodular, improvement over 10 months
	July, 1929	2,800	Stationary.
2884	January, 1929	840	On admission, nodular.
	July, 1929	3,600	No improvement.
2888	February, 1929	12,000	On admission, marked infiltration and edema.
	March, 1929	8,400	Definite improvement
	July, 1929	3,600	Marked improvement since admission.
2891	February, 1929	1,800	On admission, heavy nodular.
	July, 1929	1,200	Slight improvement.
2850	February, 1929	1,500	Nodular, heavy
	July, 1929	800	Definite improvement.
2852	January, 1929	2,500	Nodular
	July, 1929	2,400	Slight improvement.
2830	February, 1929	1,400	Nodular
	July, 1929	800	Definite improvement following reaction
2982	March, 1929	40	Nodular improving
	July, 1929	40	Do
2116	February, 1929	12,000	Nodules, breaking down and ulcerating.
	July, 1929	20,000	Ulceration more marked

A study of Table 8 and the following case reports will show changes in the Wassermann, Kahn, and quantitative Kahn similar to those expected in treated and untreated cases of syphilis, although none of the cases had received antisyphilitic therapy.

TABLE 8.—*The relationship of the Wassermann and Kahn reactions and the number of Kahn units to the clinical progress of leprosy*

Case	Date	Wassermann		Kahn			Kahn units	Remarks
		0.1 c. c.	0.05 c. c.	0.05 c. c.	0.025 c. c.	0.0125 c. c.		
2893	February, 1929	3	4	4	4	4	10,000	
	June, 1929	3	4	4	4	4	4,000	Definite improvement.
2857	August, 1928	4	4	4	4	4		
	January, 1929	2	3	4	4	4	7,600	Slow but definite improvement.
	July, 1929	2	2	4	4	4	2,000	Continued improvement.
2838	August, 1928	1	3	4	4	4		
	February, 1929	0	0	4	4	4	8,400	Definite improvement.
	July, 1929	0	0	4	4	4	2,000	Continued improvement.
2888	February, 1929	3	4	4	4	4	12,000	
	July, 1929	3	3	4	4	4	3,600	Marked improvement.
2891	February, 1929	4	4	4	4	4	1,800	
	July, 1929	4	4	4	4	4	1,200	Slight improvement.
2830	April, 1928	4	4	4	4	4		
	February, 1929	3	4	4	4	4	1,400	Stationary.
	July, 1929	2	2	4	4	4	800	Marked improvement, following a reaction.
2850	February, 1929	4	3	4	4	4	1,500	
	July, 1929	3	3	4	4	4	800	Definite improvement.
2863	August, 1928	4	4	4	4	4		
	January, 1929	4	4	4	4	4	480	Improving.
	March, 1929	4	4	4	4	4	400	Do.
	July, 1929	4	4	4	4	4	2,800	Reaction.
2837	July, 1928	4	4	4	4	4		
	October, 1928	1	1	4	4	4		
	March, 1929	1	2	4	4	4	2,000	Improving.
	July, 1929	3	4	4	4	4	2,800	Stationary.
2884	January, 1929	2	2	4	4	4	840	On admission.
	July, 1929	3	4	4	4	4	3,600	No clinical change noted.
2116	August, 1923	0	0	0	0	0		
	April, 1924	0	0	0	0	0		
	August, 1928	1	3	4	4	4		
	February, 1929		2	4	4	4	12,000	Marked nodulation, ulceration; breaking down of nodules
	July, 1929	3	4	4	4	4	20,000	Ulceration and colliquation increased.

Case 2893.—On admission: Heavy nodulation and infiltration of ears, face, and extremities; marked edema and cyanosis of hands and feet; Wassermann 3, 4; Kahn 4, 4, 4; quantitative Kahn 10,000. After 4 months of slight clinical improvement: decrease in infiltration, desquamation of lesions of legs; Wassermann and Kahn unchanged, quantitative Kahn 4,000.

Case 2857.—On admission: Moderate nodulation and infiltration of ears, face, and extremities; marked edema and cyanosis of hands and feet. Wassermann 4, 4; Kahn 4, 4, 4. No quantitative Kahn made. After 5 months of slow steady improvement: Wassermann 2, 3; Kahn 4, 4, 4; quantitative Kahn 7,600. Six months more of slow definite improvement: Wassermann 2, 2; Kahn 4, 4, 4; quantitative Kahn, 2,000.

Case 2838.—On admission: Moderate nodulation of ears, face, and extremities; marked edema of hands and feet; Wassermann 1, 3; Kahn 4, 4, 4; quantitative Kahn not determined. After 6 months of definite improvement: Wassermann, negative; Kahn 4, 4, 4; quantitative Kahn 8,400; after 5 months of continued improvement: Wassermann negative; Kahn 4, 4, 4; quantitative Kahn 2,000.

Case 2888.—On admission: Advanced nodular, heavy infiltration of ears, face, trunk, and extremities; marked edema and cyanosis of hands and feet; Wassermann 3, 4; Kahn 4, 4, 4; quantitative Kahn 12,000; after 5 months marked improvement though still marked infiltration; severe keratitis cleared; edema and cyanosis of feet much improved; Wassermann and Kahn unchanged; quantitative Kahn from 12,000 to 3,600.

Case 2891.—On admission: Heavy infiltration of ears and face; Wassermann 4, 4; Kahn 4, 4, 4; quantitative Kahn 1,800; after 5 months of slight improvement: Wassermann 4, 4; Kahn 4, 4, 4; quantitative Kahn 1,200.

Case 2830.—On admission: Advanced infiltrated leprosy; Wassermann 4, 4; Kahn 4, 4, 4; no quantitative Kahn determined. After 10 months of no evident clinical change: Wassermann 3, 4; Kahn 4, 4, 4; quantitative Kahn 1,400. Definite improvement following acute reaction; Wassermann 2, 2; Kahn 4, 4, 4; quantitative Kahn 800.

Case 2850.—On admission: Advanced nodular; Wasserman 4, 3; Kahn 4, 4, 4; quantitative Kahn 1,500; after 5 months of slight clinical improvement: Wassermann 3, 3; Kahn 4, 4, 4; quantitative Kahn 800.

Case 2863.—On admission: Advanced nodular; Wassermann 4, 4; Kahn 4, 4, 4; quantitative Kahn not determined. After 7 months of slight improvement: Wassermann 4, 4; Kahn 4, 4, 4; quantitative Kahn 400. Nine months after admission: Increased erythema of existing lesions and appearance of new lesions; Wassermann 4, 4; Kahn 4, 4, 4; quantitative Kahn 2,800.

Case 2116.—Admitted 5 years before this study was begun. On admission: Moderate nodular; Wassermann and Kahn negative. Five years later: Extremely nodular with some degeneration of lesions; Wassermann 1, 3; Kahn 4, 4, 4; no quantitative Kahn determined. Six months later: Marked degeneration and ulceration of lesions; Wassermann 0, 2; Kahn 4, 4, 4; quantitative Kahn 12,000. Five months later: Marked increase in degeneration and ulceration; Wassermann 3, 4; Kahn 4, 4, 4; quantitative Kahn 20,000.

This study of the quantitative Kahn determinations on a small group of lepers reveals changes in the number of units correlated with clinical changes in the leprosy.

The results of the Wassermann and Kahn tests and the quantitative Kahn are variable during the course of the disease. Variations occur with the sera of patients who have received no antisyphilitic therapy. They bear a definite relation to changes in clinical manifestations of the leprosy. It is believed, therefore, that this study shows further evidence that a positive Wassermann or a positive Kahn test with the sera of lepers does not necessarily signify the presence of a syphilitic infection.

SUMMARY

1. There occurred an abnormally high incidence of positive serum reactions in the cases studied.

2. The positive reactions occurred nearly twice as frequently among the females as the males.

3. The positive reactions were more frequent among the patients under than those over 20 hears of age.

4. Positive reactions were three times as frequent among the lepers as among a control group.

5. Definite changes in the serum reactions correlated with changes in the clinical manifestations of the leprosy were observed.

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THE COUNTY HEALTH UNIT OF YESTERDAY AND TO-DAY [1]

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Since the first full-time county health unit was organized in Yakima County, Wash., in 1911, many changes have been made in the plan of conduct of county health programs. Where the public health dollar formerly purchased only environmental sanitation, it is now also being spent for immunization against typhoid fever, diphtheria, smallpox, and scarlet fever, and for the purchase of immune sera in the treatment of poliomyelitis and other diseases. Oral and mental hygiene have been included in many public health programs as routine procedures, while child hygiene has rightly come into its own to claim a large portion of the time and efforts of the personnel.

[1] Read before the Annual Conference of County Health Officers, at Bellingham, Wash., Sept. 4–5, 1930.

Nutritional and prenatal clinics, measures for the prevention of tuberculosis, pellagra, rickets, hookworm infestation, Rocky Mountain spotted fever, tularæmia, malaria, and many other preventable or controllable diseases, including food poisoning, have come to be definite responsibilities of those who are engaged in public health work. Where a few hundreds of dollars were formerly, and sometimes reluctantly, provided by public officials for manning the one- or two-person county health departments of 19 years ago, thousands of dollars are now appropriated in many instances for employing experienced personnel trained in the field of disease prevention. The full-time county health unit plan has passed through the period of skepticism and doubt, when the soundness of its principles was questioned by business men and it was looked upon as a fad by the uninformed general public. It has at last come to be considered an absolute necessity for every progressive rural community and is recognized as a sound business enterprise which, when conducted properly, will pay greater dividends on the capital invested than any other investment to which the public may subscribe.

We have arrived at the time when it is much easier to obtain necessary funds for establishing county health units than it is to provide them with experienced personnel, and we must soon turn our attention to the intensive training of public health executives and to familiarizing ourselves better, as public health officials, with the wider viewpoints of the public health field. There is no movement of the present day which offers greater opportunity at the top than does public health. While some of our leading universities are including public health courses as a part of their standard curricula, we are still faced with the necessity of relying to too great an extent upon the school of practical experience to furnish our public health officials. One can scarcely overemphasize the importance of annual or semiannual assemblages of county and State health workers, where information obtained at round-table discussions will later result in greater accomplishments in widespread communities.

Formerly county health programs were conducted under the "trial and error method"; but we are now coming to follow very definite and clear-cut lines of procedure. The policy of the health officer of to-day, whether he be local, State, or Federal, is a common policy with a definite objective in view; and while conditions may vary widely in different sections of a State, or in different States, all are working toward a common end. Teamwork is necessary, however, between public health officials, and with the State as a unit, the monthly or semimonthly news letter, edited by the State department of health and circulated among all of its public health workers, is a very effective method of familiarizing every community with the procedures of public health workers in other communities.

Leadership is an important attribute of the public health official who is to be successful in his community. He should therefore make every effort to secure the active participation and cooperation of those organizations which can help him most in his community program and without which his work can not be an outstanding success. He should have the support and cooperation of the organized medical profession. The progressive private practitioner, whether he be family physician in general practice or highly trained specialist, should be considered his greatest friend and ally in the public health program. The health officer should also have the cooperation of boards of education and of unofficial voluntary agencies which are interested or engaged in public health work. This can frequently be obtained through advisory committees composed of representatives of the different groups which are interested in various phases of the program. These committees should function in addition to the usual official board of health. When such cooperation has been obtained, it is necessary for the health officer to exhibit qualities of statesmanship in order that he may have the worthy suggestions offered by advisory committees approved by his board of health. It is only through such coordination of effort that the most effective educational programs can be carried out, and it is only through educational work that the desired results may be obtained.

The health officer must also be a student of public-health policies, as it is only through his familiarity with the most approved policies in health protection and promotion that he can assume the rôle of Kipling's Sir Anthony Gloucester who, as a secret of his success and leadership, said: "I give them the scripture text, I keep my light so shining a little ahead of the next."

While conditions and practices may vary widely in different localities, there are certain phases of public health work which are of equal importance to all health officers, no matter how widely they are separated geographically. One of the most important of these is the promotion of child health. In the conduct of effective child-health programs the voluntary agency can be of great assistance and the cooperation of boards of education is essential. Too often in the past we have considered the routine medical inspection of school children as fulfilling our obligation to the school child. As a matter of fact, our obligation has just started when the medical inspection has been completed, and our efforts shall have been time lost unless ways and means are provided for bringing about the correction of the physical defects found. To accomplish this many plans may be resorted to, but first of all the child himself should be induced to become interested in his own physical welfare. It is possible that his interest and cooperation may be brought about through constant classroom instruction; but he will be more interested if he knows that his teacher

and his parents are also concerned. Usually without the cooperation of the parent and the teacher, the child's interest will soon lag. Active parent-teacher associations are, therefore, necessary, and the public-health nurse or health officer who can create what may be termed "a community health spirit" has won half the battle.

Competition between schools for obtaining corrections of physical defects is frowned upon by some of our leading health educators; but, in the last analysis, results are what we are seeking, and if better results may be obtained through competitive programs, why should not competition be advocated by public health workers? Perhaps one of the most effective systems is that of furnishing to each teacher a classroom health chart to be publicly displayed. This shows by red stars the normal conditions found in each child at examination, by blue stars the physical defects corrected by each child after the examination is completed, and by gold stars those children who have had all corrections made. As a further inducement a blue ribbon may be offered to those children who have had corrections completed; also a holiday at some period late in the school year may be offered to individual classes which reach a certain definite percentage of defects corrected through the year. Such a program may be put on a still further competitive basis by offering a silver cup or other appropriate prize to the school, the entire enrollment of which has made the greatest progress in public health advancement. To put over such a health program requires leadership on the part of the health officer and the public health nurses who come in contact with the school children, their teachers, and parents.

While great progress has been made during the last two decades in the reduction of the national tuberculosis rate, it is considered by many experts that the tuberculosis rate can not be reduced much further under our present methods of tuberculosis control. Further reduction will necessitate a more careful examination of tuberculosis contacts and suspects by medical men who are experienced in tuberculosis work and are able to detect the disease in its early stages. It will also require a much more thorough follow-up system on the part of our health departments in order that the education of individuals may be more effective. Usually expert assistance may be had for the examination of tuberculous suspects if chest clinics are held periodically through the year. The cost of necessary X-ray examinations may be provided if the necessity therefor is properly presented to interested voluntary agencies.

There is little that is more appealing to the public mind than the organization and conduct of crippled children's societies on a county-wide basis. Such societies should not be maintained by the solicitation of funds from individuals, but should be supported by memberships of various kinds to be sold to those who are interested in that

particular phase of public health work. The memberships may cost varying sums, depending upon the type desired by the individual. They may be designated as members, sustaining members, contributing members, or life members, each membership to cost such sums as agreed upon by vote of the society. Crippled children's societies, if organized and conducted properly, can always count upon support from Rotary clubs, Kiwanis clubs, medical societies, and other organizations which are usually interested in that type of work. Under such an organization all cripples of whatever age, financial standing or degree of deformity, should be offered free examination and advice, but should be required to pay such amount as they are able for corrective work done. Where individuals are not in a position to pay in full or in part for corrections made, the service should be given them without cost. The county health department is in the best position to foster such a program and, through the routine examination of all school children, it is in a position to discover all the crippled population of an entire county. The health officer who is sufficiently aggressive, farsighted, and interested to put over successfully such a program always utilizing the public to the greatest advantage, need not worry about the next year's budget for his health department.

Another very important activity to be considered, where funds will permit, is the conduct of oral hygiene campaigns in connection with county health programs. This service may be given at comparatively small cost to the health department, if a minimum charge is made for the work done. Boards of education can usually be convinced of the necessity for dental corrective work and their cooperation may be obtained in bringing it about, if definite information is presented, showing the number of children in need and the extent of the need for each child. The equipment necessary need not be elaborate to begin with and the program should be started on a small scale. A dentist may be engaged for only a few hours a day if funds will not permit of his employment for longer periods. Portable equipment, purchased by the board of education or by interested lay societies or organizations, may be moved from school to school where rural schools are being served. A central operating room for the dentist may be established where city schools are being served, and the children may be required to appear at the dentist's office according to a schedule previously arranged by the school nurse.

Depending upon the demand for the service at later periods, a more elaborate equipment may be purchased and more personnel may be employed. Under such a program, cleaning of the teeth, extractions, temporary fillings, and the treatment of mouth infections should be considered a duty of the dentist in charge. Where or when available funds will permit, this service should be given to all children through the grade-school age without cost. The program should be approved

by the local dental society and, if possible, local dentists should be induced to do the work. In one county in a Pacific Coast State, such a program has been developed within a period of three years from a few hours' service given on three days a week by a dentist selected by the local society, to the employment of two full-time dentists on an annual basis, with full equipment to care for all of the children of the entire county. One of the dentists gives her entire time to city school children and is established in a central office where the children come by appointment. The other travels from one rural school to another in a large inclosed truck which is completely equipped as a dental office and includes all necessary instruments, sterilizing equipment, compressed air, filing cabinets for keeping records, and a sufficient water supply for each day's work. Some time after the system had been working in full force the writer had occasion to talk to the president and other members of the local dental society and was told that the educational work resulting from the dental hygiene campaign had not only relieved the members of the society engaged in private practice from doing a type of work for which they do not particularly care, but that it had doubled the demand for corrective work in the older children of grade-school and high-school age. In such programs women dentists may be employed if it is possible to obtain them, as they are usually very successful with small children and can be depended upon to stay with the work for long periods.

It is believed by health officers who have included dental hygiene as a routine part of their public health programs, that there is no phase of work which is more popular with the public, especially with the people of the rural areas, than is the dental hygiene program. Certainly there is little more far-reaching in its effect upon the physical welfare of an individual than good teeth. More attention should be given to the care of the teeth during the early years of life, and this field offers an opportunity to the local health officer to render a greatly neglected and much needed service to approximately 70 per cent of the child population of his community.

Many other new and important activities are now confronting the county health officer which were not formerly considered a part of the county health program. They are demanding time and attention and the routine public health program of the future must be arranged so as to include them. Among those of most importance may be mentioned studies in mental hygiene, educational programs pertaining to the control of cancer and tuberculosis through early diagnosis and treatment; the correction of endocrinological deficiencies in the infant, preschool, and grade-school child; the establishment of nutritional and prenatal clinics; and similar activities. In that one of the aims of the modern health movement is the prolongation of life, the health department may also be particularly concerned in the great

increase of deaths occurring during recent years as a result of automobile accidents. Every effort should be made by public health officials in cooperation with law-enforcement officials to keep constantly before the public knowledge of the great toll of lives that are unnecessarily being lost each year through careless driving and measures for meeting this situation.

Great progress was made through educational programs during and shortly after the World War in enlightening the public as to the dangers of venereal disease. It seems that there has been a considerable let-up on the part of public health officials during recent years in their efforts to control venereal infections. To say nothing of the great loss of health and life incident to venereal infection, it is probable that these diseases are still responsible for the greatest economic loss to the people of the country of any group of diseases. Antivenereal disease educational programs and the conduct of venereal treatment clinics can not be too strongly urged as a routine procedure for the local health department. A county health program can not be considered as being a well-rounded program if it does not include this phase of work.

The several phases of public health mentioned above are of comparatively recent origin, but they must be met by the health program of the future. Though mention has not been made of the necessity for food and dairy sanitation, for farm sanitation, for immunization and vaccination campaigns against diphtheria, typhoid fever, and smallpox, for communicable disease control through isolation and quarantine, it is assumed that these activities are already established routine procedure of every active health department.

The movement for full-time county health departments throughout the country has made great progress during the 19 years since the first full-time unit was established on July 1, 1911, in the State of Washington. With 505 full-time county units in operation on January 1 of this year (1930), we will approach the 600 mark before the year is over. Approximately 24 per cent of our rural population is now being served by a health service that is reasonably effective, but which still has room for considerable improvement. We yet have about 3,000 counties in the United States in which full-time county or district health service is applicable. The development of this tremendous field in the future can take place only as fast as we can train personnel to take charge of the individual units. With so great a demand for trained personnel during the next 10 or 20 years, and with the many added responsibilities which are being incorporated into the public health program in increasing numbers each year, the public health official must be progressive if he would successfully meet the situation. The time when the political appointee can expect to be tolerated in the public health field without progressing with the movement is about past. The people the country over are very rapidly coming to know what the prevention of disease and the

promotion of the public health mean in a literal sense. They realize its importance both from the standpoint of the prevention of unnecessary suffering and death and from the standpoint of dollars and cents saved. Public sentiment, therefore, is demanding higher standards and more efficient health-protective service than could be given a decade ago, when public health appointments were made primarily to fulfill political obligations and, perhaps, secondarily, to the lowest bidder for the position. Since the full-time county health department movement started a little less than 20 years ago, the national death rate from all causes has dropped from a little more than 14 per 1,000 population to 11; the tuberculosis (respiratory) death rate has dropped from 138 per 100,000 population to 68; the infant-mortality rate has been reduced from 129 per 1,000 children born to 68; the typhoid fever rate has been reduced 80 per cent; and the diphtheria rate has been reduced about 65 per cent in the same period of time.

With such an enviable record to look back upon the public health field has greater progress to look forward to and to work for in the future. Although many of our public health executives are still handicapped by lack of funds to carry on rapidly expanding programs, it is nevertheless true that the health officer who possesses the qualifications of leadership, statesmanship, and organization ability, can frequently overcome handicaps which would otherwise completely retard his progress. We should therefore continue to carry on with ever broadening viewpoints of the rapidly growing and fascinating field of public health administration. The old adage "There is more in the man than there is in the land" is just as true of the field of public health as it is in farming, or in any other line of endeavor.

DEATH RATES IN A GROUP OF INSURED PERSONS

Rates for Principal Causes of Death for February, 1931

The accompanying table, taken from the Statistical Bulletin for March, 1931, issued by the Metropolitan Life Insurance Co., presents the mortality record of the industrial insurance department of the company for February, 1931, as compared with that for the preceding month and for the corresponding month of last year. It also gives a comparison of the cumulative rates for January and February of the years 1931 and 1930. The rates are based on a strength of approximately 19,000,000 insured persons in the United States and Canada.

With regard to health conditions in this group of persons during February, 1931, the Bulletin states:

> Although health conditions in both January and February were by no means as good as last year, the cumulative death rate for these two months is not far from the average for the same period during the last 10 years. The year-to-date mortality rate, in fact, was only 6.3 per cent higher than the minimum for this two-month period—recorded only last year.

The higher mortality this year has not applied to Canada and that part of the United States lying west of the Rocky Mountains. Among approximately one and one-quarter millions of Metropolitan policyholders who live in Canada, the early 1931 health record has indeed been better than ever before, and among 1,140,000 living west of the Rockies a slight drop is in evidence as compared with last year.

The relatively higher mortality in January and February was due, directly or indirectly, to the widespread prevalence of influenza and pneumonia. The combined death rate for these diseases at the end of February was 27.6 per cent higher than in 1930. As invariably happens when there is above-average prevalence of influenza, increased death rates were recorded for the principal degenerative conditions (heart disease, chronic nephritis, and cerebral hemorrhage). The mortality rates for cancer and diabetes also increased sharply, and it is certain that influenzal attacks hastened the deaths of many persons affected with these chronic conditions. The increase in the general death rate only serves to emphasize that any widespread outbreak of influenza, even though the type be relatively mild, constitutes a serious public health hazard.

There are three outstandingly favorable items in the early 1931 health record: (1) The remarkably low diphtheria death rate is foremost. The cumulative mortality rate for this disease is at the very low figure of 6.3 per 100,000, a drop of 37 per cent from the previous minimum for the like period of any year. (2) The mortality from tuberculosis has actually recorded a small decline in spite of the increase in the general death rate. This gives reason for the belief that the continuity of the drop in the tuberculosis mortality rate will not be interrupted this year. (3) Diseases incidental to pregnancy and childbirth caused fewer deaths in January and February than during the corresponding period of any previous year.

Death rates (annual basis) per 100,000 for principal causes of death

[Industrial insurance department, Metropolitan Life Insurance Co.]

Cause of death	Rate per 100,000 lives exposed [1]				
	Feb. 1931	Jan. 1931	Feb. 1930	Cumulative Jan.-Feb.	
				1931	1930
Total, all causes	1,034.4	989.5	963.8	1,010.9	951.3
Typhoid fever	1.3	1.4	1.3	1.4	1.2
Measles	3.0	2.6	3.3	2.8	2.7
Scarlet fever	4.1	3.3	3.9	3.7	3.8
Whooping cough	4.6	4.0	5.5	4.3	5.0
Diphtheria	5.7	6.8	9.0	6.3	10.0
Influenza	58.6	30.3	27.3	43.8	26.7
Tuberculosis (all forms)	81.9	78.0	82.3	79.8	80.9
Tuberculosis of respiratory system	72.2	69.9	71.9	71.0	70.8
Cancer	84.0	81.6	73.1	82.7	73.8
Diabetes mellitus	25.3	23.5	20.2	24.3	21.3
Cerebral hemorrhage	64.2	75.1	68.2	69.9	63.5
Organic diseases of heart	171.9	175.6	169.0	173.8	165.0
Pneumonia (all forms)	146.7	122.9	117.2	134.2	112.8
Other respiratory diseases	15.1	13.8	11.8	14.4	12.6
Diarrhea and enteritis	9.1	11.1	11.1	10.1	11.3
Bright's disease (chronic nephritis)	76.1	74.6	71.0	74.9	72.4
Puerperal state	10.9	11.1	14.4	11.0	13.1
Suicides	9.3	7.7	7.5	8.5	8.1
Homicides	5.6	6.8	5.5	6.2	6.3
Other external causes (excluding suicides and homicides)	51.5	58.2	58.7	55.1	60.1
Traumatism by automobiles	15.3	21.7	16.4	18.7	18.4
All other causes	206.5	200.9	203.5	203.6	200.8

[1] All figures in this table include insured infants under one year of age. The rates are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.

COURT DECISION RELATING TO PUBLIC HEALTH

Conviction for unlawful possession of cocaine hydrochloride sustained.—(Montana Supreme Court; State *v.* Mah Sam Hing, 295 P. 1014; decided Feb. 2, 1931.) The defendant was convicted of violating section 3200 of the Revised Codes, 1921, by having unlawfully in his possession some cocaine hydrochloride. One of the points decided by the supreme court was that the drugs referred to in section 3200 were those enumerated in section 3186 of the Revised Codes as amended by chapter 5 of the laws of 1929. The court stated that, while the reference in section 3200 was originally to the drugs specified in section 3189, the later amendment of section 3186, being the most recent expression of the legislature with respect to the matter, superseded section 3189. Section 3186 specifically mentioned "alkaloid cocaine" or "any derivative" thereof, and there was testimony that hydrochloride cocaine was derived directly from alkaloid cocaine.

DEATHS FROM INFLUENZA AND PNEUMONIA IN LARGE CITIES

Deaths from influenza and pneumonia (all forms) in certain large cities of the United States during the five weeks ended April 4, 1931—a continuation of the table appearing on page 658 of the Public Health Reports dated March 20, 1931. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

City	Influenza					Pneumonia				
	Week ended—					Week ended—				
	April	March				April	March			
	4	28	21	14	7	4	28	21	14	7
Total	168	188	212	255	293	1,198	1,185	1,254	1,290	1,332
Akron	1	1	1	1	1	8	13	9	11	10
Albany	1	0	1	0	0	8	5	4	8	6
Atlanta	0	3	10	9	10	6	6	9	13	12
Baltimore	2	1	2	8	3	49	45	54	70	42
Birmingham	5	9	8	5	5	7	9	11	11	6
Boston	0	1	1	2	2	21	16	21	23	29
Bridgeport	1	2	2	4	1	4	5	7	5	4
Buffalo	3	2	4	1	3	26	31	41	25	35
Cambridge	0	0	0	0	2	4	3	1	2	3
Camden	0	0	0	0	0	7	8	12	11	2
Canton	1	1	3	7	1	2	3	6	6	3
Chicago	8	8	10	14	12	74	57	67	79	67
Cincinnati	5	3	5	6	9	12	16	10	21	16
Cleveland	4	7	8	7	17	34	31	35	38	40
Columbus	2	7	5	6	4	2	10	14	15	7
Dallas	7	8	3	3	2	21	18	12	11	8
Dayton	1	0	2	1	3	8	5	10	9	7
Denver	1	3	3	8	4	15	12	15	25	16
Des Moines	0	1	1	1	0	1	4	5	5	6
Detroit	5	6	10	7	16	41	42	41	40	44
Duluth	0	0	0	0	3	0	0	0	3	3
El Paso	1	2	0	2	2	5	3	4	4	6
Erie	1	2	0	3	2	2	4	4	2	3
Fall River	0	0	0	1	1	2	5	6	2	8
Flint	0	1	3	0	4	2	5	6	10	7
Fort Worth	2	1	1	2	0	5	6	7	4	5
Grand Rapids	0	0	2	1	3	1	2	4	0	1

Deaths from influenza and pneumonia (all forms) in certain large cities of the United States during the five weeks ended April 4, 1931, etc.—Continued

City	Influenza, Week ended— April 4	Influenza, March 28	Influenza, March 21	Influenza, March 14	Influenza, March 7	Pneumonia, Week ended— April 4	Pneumonia, March 28	Pneumonia, March 21	Pneumonia, March 14	Pneumonia, March 7
Houston	1	0	0	1	1	7	5	5	7	8
Indianapolis	1	2	0	1	2	14	16	16	26	19
Jersey City	0	1	0	2	1	15	9	15	15	12
Kansas City, Kans	2	0	1	3	2	4	8	8	5	7
Kansas City, Mo	0	1	3	1	2	13	11	27	16	23
Knoxville	2	0	1	5	0	2	5	2	2	1
Long Beach	0	0	0	1	1	0	3	5	1	2
Los Angeles	2	7	4	5	5	26	18	17	20	17
Louisville	1	1	5	5	1	17	7	11	23	22
Lowell	1	0	0	0	1	5	6	5	1	4
Lynn	0	0	0	1	1	6	3	5	5	4
Memphis	8	8	4	7	5	10	13	9	18	13
Miami	0	3	1	1	0	2	4	3	0	3
Milwaukee	4	4	2	5	8	5	8	12	8	19
Minneapolis	2	4	2	6	7	10	12	13	13	18
Nashville	7	1	2	3	11	6	5	7	6	13
New Bedford	0	0	0	0	0	8	2	5	2	5
New Haven	1	1	1	0	3	2	7	6	7	3
New Orleans	3	3	4	4	5	18	22	21	25	11
New York	17	18	22	22	30	283	258	241	255	291
Newark, N. J	0	0	0	0	0	16	11	10	13	7
Oakland	2	1	2	3	1	3	6	4	6	5
Oklahoma City	3	5	5	0	2	18	17	8	12	6
Omaha	0	0	0	0	0	10	8	10	9	13
Paterson	0	0	0	1	1	4	5	2	7	3
Philadelphia	11	9	15	12	16	100	88	100	83	87
Pittsburgh	9	11	8	14	21	42	69	53	66	62
Portland, Oreg	1	4	1	2	2	9	11	6	10	11
Providence	0	0	0	4	1	14	8	13	5	11
Richmond	0	5	0	3	2	5	4	7	7	7
Rochester	0	1	1	2	1	5	11	11	10	13
St. Louis	5	0	2	4	0	31	32	23	28	47
St. Paul	0	0	4	2	2	7	7	13	7	11
Salt Lake City	2	2	1	0	1	2	2	1	3	0
San Antonio	8	5	3	3	7	6	9	6	3	17
San Diego	1	0	1	0	1	4	2	4	3	2
San Francisco	1	4	6	4	5	4	5	11	11	15
Schenectady	1	1	0	2	1	4	2	0	3	4
Seattle	7	8	10	10	14	7	7	14	10	12
Somerville	0	0	0	0	0	4	2	2	5	4
South Bend	0	0	0	0	0	0	5	5	2	6
Spokane	1	1	6	1	2	1	1	7	3	2
Springfield, Mass	0	0	0	2	1	10	5	3	8	9
Syracuse	0	1	1	0	0	1	3	8	4	7
Tacoma	2	4	3	4	3	3	8	8	4	3
Toledo	4	1	3	7	5	17	12	8	16	11
Trenton	0	1	0	1	0	10	10	3	9	6
Utica	0	0	0	0	0	4	5	4	1	3
Washington, D. C	3	1	3	0	3	17	30	31	15	25
Waterbury	0	0	0	0	1	5	2	3	2	2
Wilmington, Del	1	0	0	0	1	6	8	3	3	4
Worcester	0	0	0	0	0	7	4	7	4	2
Yonkers	0	0	0	0	0	2	4	7	4	2
Youngstown	3	0	0	2	4	6	6	11	6	12

DEATHS DURING WEEK ENDED APRIL 4, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended April 4, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended April 4, 1931	Corresponding week, 1930
Policies in force	75, 139, 274	75, 712, 783
Number of death claims	13, 411	15, 574
Death claims per 1,000 policies in force, annual rate	9. 3	10. 7

Deaths **[1]** ***from all causes in certain large cities of the United States during the week ended April 4, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930.*** *(From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Apr. 4, 1931				Corresponding week, 1930		Death rate [2] for the first 14 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (81 cities)	8,929	13.1	787	[4] 62	13.5	904	14.0	13.3
Akron	34	6.9	5	49	9.6	7	8.5	8.9
Albany [5]	32	12.9	1	20	17.1	4	15.1	16.6
Atlanta	74	13.9	12	123	14.2	5	16.6	17.2
White	34		3	48		2		
Colored	40	([6])	9	259	([6])	3	([6])	([6])
Baltimore [5]	244	15.6	18	61	16.1	22	17.4	15.8
White	174		13	56		14		
Colored	70	([6])	5	78	([6])	8	([6])	([6])
Birmingham	102	19.7	7	70	13.3	8	15.8	14.5
White	49		5	86		0		
Colored	53	([6])	2	49	([6])	8	([6])	([6])
Boston	221	14.7	22	63	16.7	26	16.0	16.1
Bridgeport	32	11.3	1	17	12.1	2	13.1	14.2
Buffalo	161	14.4	13	53	15.9	24	15.5	14.5
Cambridge	28	12.8	2	40	16.0	2	14.1	14.5
Camden	35	15.3	2	35	18.4	7	18.4	15.4
Canton	28	13.7	4	91	9.4	8	11.2	11.5
Chicago [5]	720	11.0	73	65	12.6	95	12.0	11.8
Cincinnati	151	17.2	11	66	19.0	29	17.9	17.7
Cleveland	236	13.5	15	44	11.6	15	12.7	12.3
Columbus	97	17.1	4	30	16.3	13	15.2	15.3
Dallas	76	14.6	4		11.3	7	12.7	12.6
White	55		3			7		
Colored	21	([6])	1		([6])	0	([6])	([6])
Dayton	60	15.1	5	70	9.0	2	14.1	10.5
Denver	86	15.4	5	48	17.7	8	16.0	15.7
Des Moines	25	9.0	1	18	12.0	3	12.5	12.8
Detroit	315	9.9	34	54	11.4	54	9.7	10.5
Duluth	14	7.2	0	0	9.2	1	11.6	11.3
El Paso	41	20.4	5		19.8	3	18.8	18.6
Erie	24	10.6	2	37	12.6	1	11.5	11.4
Fall River [5, 7]	33	14.9	2	45	12.7	8	14.0	14.0
Flint	19	6.0	4	51	8.3	6	8.0	10.3
Fort Worth	43	13.4	3		11.4	4	12.1	12.3
White	39		3			3		
Colored	4	([6])	0		([6])	1	([6])	([6])
Grand Rapids	27	8.2	1	15	17.6	3	9.7	11.9
Houston	61	10.3	6		11.3	6	11.9	13.0
White	39		3			4		
Colored	22	([6])	3		([6])	2	([6])	([6])
Indianapolis	94	13.3	5	41	15.3	5	15.5	16.3
White	74		4	38		2		
Colored	20	([6])	1	67	([6])	3	([6])	([6])
Jersey City	90	14.7	14	124	13.0	13	13.8	12.7
Kansas City, Kans	35	14.8	1	21	16.7	2	15.8	13.0
White	29		1	25		1		
Colored	6	([6])	0	0	([6])	1	([6])	([6])
Kansas City, Mo	113	14.4	10	76	14.5	8	15.5	14.4
Knoxville	31	14.8	2	43	9.8	3	14.5	16.0
White	26		2	48		3		
Colored	5	([6])	0	0	([6])	0	([6])	([6])
Long Beach	27	9.2	0	0	10.1	2	10.8	10.6
Los Angeles	233	9.2	16	46	10.8	21	11.8	12.2
Louisville	106	17.9	11	94	14.4	6	17.5	14.7
White	83		7	69		6		
Colored	23	([6])	4	265	([6])	0	([6])	([6])
Lowell [7]	31	16.0	2	51	11.9	3	15.1	15.2
Lynn	24	12.2	1	26	6.1	1	12.8	12.0
Memphis	112	22.6	14	148	19.9	9	18.6	18.2
White	61		6	100		5		
Colored	51	([6])	8	232	([6])	4	([6])	([6])
Miami	21	9.7	1	25	16.4	3	14.6	13.9
White	14		0	0		1		
Colored	7	([6])	1	88	([6])	2	([6])	([6])

See footnotes at end of table.

Deaths[1] *from all causes in certain large cities of the United States during the week ended April 4, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930*—Continued

City	Week ended Apr. 4, 1931				Corresponding week, 1930		Death rate [2] for the first 14 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Milwaukee	109	9.6	11	48	10.0	14	10.7	10.8
Minneapolis	100	11.0	13	84	10.5	8	12.4	11.4
Nashville	69	23.1	6	89	24.7	9	18.7	17.9
White	33		5	100		6		
Colored	36	(6)	1	59	(6)	3	(6)	(6)
New Bedford [7]	28	13.0	6	159	14.8	3	13.4	12.3
New Haven	34	10.9	3	57	11.2	3	13.5	14.8
New Orleans	161	18.0	19	104	18.0	17	19.7	19.5
White	97		7	58		10		
Colored	64	(6)	12	196	(6)	7	(6)	(6)
New York	1,737	12.8	147	61	13.0	138	13.5	12.2
Bronx borough	229	9.0	25	57	8.5	7	9.8	8.7
Brooklyn borough	600	11.9	50	53	11.9	61	12.6	11.3
Manhattan borough	693	19.9	53	90	19.4	49	20.6	18.1
Queens borough	165	7.5	17	46	9.3	16	8.7	8.0
Richmond borough	50	16.0	2	36	16.7	5	14.5	15.2
Newark, N. J	111	13.0	12	63	12.7	11	13.8	14.1
Oakland	62	11.1	2	26	8.4	3	12.2	12.2
Oklahoma City	62	16.4	7	97	10.8	4	12.0	10.7
Omaha	56	13.5	2	22	14.6	2	15.1	14.4
Paterson	30	11.3	3	52	13.2	4	15.8	13.6
Philadelphia	518	13.7	62	90	15.0	62	16.0	14.1
Pittsburgh	201	15.5	15	52	15.2	21	17.9	15.7
Portland, Oreg	71	12.1	3	36	10.7	3	13.0	13.9
Providence	69	14.1	12	111	16.7	8	15.3	15.5
Richmond	55	15.6	4	58	13.9	6	17.8	16.3
White	37		1	22		3		
Colored	18	(6)	3	130	(6)	3	(6)	(6)
Rochester	79	12.4	6	55	13.8	9	14.0	13.1
St. Louis	289	18.2	10	34	16.2	13	18.4	15.2
St. Paul	61	11.5	4	41	10.5	5	11.8	11.3
Salt Lake City [4]	29	10.6	4	60	19.6	6	13.2	14.5
San Antonio	63	13.7	11		19.0	15	15.2	18.8
San Diego	51	17.0	3	61	9.8	4	15.8	15.6
San Francisco	155	12.4	5	33	14.3	9	14.7	14.1
Schenectady	19	10.3	1	29	15.8	4	11.8	11.9
Seattle	110	15.4	5	47	11.4	3	13.4	12.0
Somerville	24	11.9	2	74	10.0	2	11.3	12.6
South Bend	19	9.2	3	75	11.4	1	9.4	9.9
Spokane	31	14.9	0	0	10.8	3	13.4	13.2
Springfield, Mass	41	14.0	7	107	13.9	3	14.0	14.6
Syracuse	47	11.5	4	47	12.7	4	12.9	12.9
Tacoma	27	13.1	2	51	14.1	1	15.3	13.5
Toledo	79	13.9	7	64	15.9	5	13.8	14.3
Trenton	51	21.5	7	122	14.4	4	19.9	18.2
Utica	35	17.8	0	0	22.5	6	16.6	16.7
Washington, D. C	139	14.7	9	50	16.7	19	18.4	16.1
White	83		5	41		6		
Colored	56	(6)	4	69	(6)	13	(6)	(6)
Waterbury	21	10.9	7	211	9.9	1	11.4	11.2
Wilmington, Del. [7]	34	16.6	4	86	16.6	1	16.6	15.9
Worcester	53	14.0	9	123	17.3	8	15.0	15.6
Yonkers	11	4.1	3	79	10.4	3	10.3	9.2
Youngstown	43	13.0	8	112	12.5	7	11.8	11.0

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 76 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows. Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

[These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers]

Reports for Weeks Ended April 11, 1931, and April 12, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended April 11, 1931, and April 12, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Apr. 11, 1931	Week ended Apr. 12, 1930	Week ended Apr. 11, 1931	Week ended Apr. 12, 1930	Week ended Apr. 11, 1931	Week ended Apr. 12, 1930	Week ended Apr. 11, 1931	Week ended Apr. 12, 1930
New England States:								
Maine	3	1	6	7	18	40	0	0
New Hampshire		1		2	38		0	0
Vermont					3	13	0	0
Massachusetts	52	40	8	8	478	1,291	3	2
Rhode Island	4	7	1		40	4	0	0
Connecticut	8	11	5	5	795	20	0	2
Middle Atlantic States:								
New York	119	157	[1] 20	[1] 32	2,137	1,448	17	33
New Jersey	51	90	24	24	920	1,219	8	5
Pennsylvania	96	107			4,740	1,389	14	26
East North Central States:								
Ohio	52	53	115	47	852	665	2	9
Indiana	28	22	32		953	107	15	11
Illinois	146	138	18	16	1,650	923	27	16
Michigan	15	78	18	3	93	1,998	13	41
Wisconsin	9	13	58	108	682	899	4	3
West North Central States:								
Minnesota	7	4	1	3	137	304	2	2
Iowa	3	7			19	362	2	5
Missouri	26	34	30	11	447	63	12	20
North Dakota	4	8			84	50	0	3
South Dakota	5	5	5	2	168	164	0	1
Nebraska	16	20			7	529	1	1
Kansas	9	6	3	5	23	744	3	4
South Atlantic States:								
Delaware	3	3			228	6	0	0
Maryland [2]	16	17	40	44	1,396	42	4	1
District of Columbia	6	9	3		373	12	0	1
Virginia								
West Virginia	8	14	168	28	94	137	1	2
North Carolina	20	40	32	71	1,015	41	3	9
South Carolina	4	14	1,153	603	105		4	0
Georgia [3]	6	9	410	77	146	192	1	1
Florida	6	10	68	3	260	529	1	2
East South Central States:								
Kentucky					362	46	4	11
Tennessee	2	9	203	57	51	216	2	30
Alabama	12	13	345	95	483	172	5	2
Mississippi	2	5					2	15

[1] New York City only. [2] Week ended Friday. [3] Typhus fever; 1 case in Georgia.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended April 11, 1931, and April 12, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Apr. 11, 1931	Week ended Apr. 12, 1930	Week ended Apr. 11, 1931	Week ended Apr. 12, 1930	Week ended Apr. 11, 1931	Week ended Apr. 12, 1930	Week ended Apr. 11, 1931	Week ended Apr. 12, 1930
West South Central States:								
Arkansas	2	1	209	83	24	61	1	4
Louisiana	15	18	57	10	8	78	2	5
Oklahoma [4]	17	16	150	74	21	450	2	2
Texas	20	28	77	41	67	180	1	0
Mountain States:								
Montana	3	2	-------	-------	72	41	0	2
Idaho	5	-------	4	-------	5	31	1	0
Wyoming	1	1	-------	-------	3	13	0	0
Colorado	10	5	-------	-------	139	950	0	3
New Mexico	1	9	6	-------	46	81	2	6
Arizona	-------	5	3	9	21	38	0	5
Utah [1]	-------	1	6	3	1	297	1	12
Pacific States:								
Washington	10	2	37	4	35	281	0	6
Oregon	6	4	72	39	113	159	1	1
California	70	58	100	23	1,532	2,524	7	10

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Apr. 11, 1931	Week ended Apr. 12, 1930	Week ended Apr. 11, 1931	Week ended Apr. 12, 1930	Week ended Apr. 11, 1931	Week ended Apr. 12, 1930	Week ended Apr. 11, 1931	Week ended Apr. 12, 1930
New England States:								
Maine	0	0	37	56	0	0	2	1
New Hampshire	0	0	0	20	0	0	1	0
Vermont	0	0	2	8	1	2	0	0
Massachusetts	0	1	342	292	0	0	0	6
Rhode Island	0	0	56	25	0	0	0	0
Connecticut	0	0	55	101	0	0	1	1
Middle Atlantic States:								
New York	5	1	932	589	5	14	16	6
New Jersey	0	1	287	267	0	0	3	4
Pennsylvania	0	1	640	519	0	1	11	6
East North Central States:								
Ohio	0	0	490	440	78	156	1	5
Indiana	0	0	320	212	01	167	2	5
Illinois	1	0	512	554	62	130	7	7
Michigan	0	0	280	389	31	62	2	8
Wisconsin	1	0	123	185	5	16	0	2
West North Central States:								
Minnesota	0	0	82	137	6	7	1	4
Iowa	1	0	119	105	73	122	0	0
Missouri	0	0	209	137	30	58	0	1
North Dakota	1	0	26	36	14	19	6	1
South Dakota	0	0	31	14	19	51	0	0
Nebraska	0	0	38	110	48	105	0	0
Kansas	1	0	65	170	116	135	2	1
South Atlantic States:								
Delaware	0	0	31	5	0	0	0	0
Maryland [2]	0	1	71	131	0	0	6	6
District of Columbia	0	0	20	23	0	0	1	0
Virginia	-------	1	-------	-------	-------	1	-------	-------
West Virginia	0	0	44	44	2	0	4	6
North Carolina	0	1	30	32	2	17	2	3
South Carolina	1	1	8	1	0	0	0	5
Georgia [3]	1	0	107	20	0	0	2	7
Florida	0	0	2	9	1	0	3	2
East South Central States:								
Kentucky	0	1	84	55	33	26	1	5
Tennessee	0	9	35	57	9	8	6	7
Alabama	0	0	16	9	16	8	3	1
Mississippi	1	1	21	10	64	15	5	9

[1] Week ended Friday.
[3] Typhus fever; 1 case in Georgia.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended April 11, 1931, and April 12, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Apr. 11, 1931	Week ended Apr. 12, 1930	Week ended Apr. 11, 1931	Week ended Apr. 12, 1930	Week ended Apr. 11, 1931	Week ended Apr. 12, 1930	Week ended Apr. 11, 1931	Week ended Apr. 12, 1930
West South Central States:								
Arkansas	0	0	21	18	39	6	5	0
Louisiana	1	0	18	18	40	9	3	16
Oklahoma [4]	0	0	39	41	95	98	3	4
Texas	1	0	42	42	40	67	4	9
Mountain States:								
Montana	0	0	20	35	6	20	1	1
Idaho	1	0	9	2	4	9	2	0
Wyoming	0	0	13	1	1	5	0	0
Colorado	0	0	23	40	5	15	0	0
New Mexico	0	0	10	13	0	4	1	0
Arizona	0	0	0	19	1	31	1	0
Utah [3]	0	0	7	13	0	0	0	0
Pacific States:								
Washington	0	0	48	51	51	97	3	2
Oregon	0	0	9	17	21	16	3	1
California	4	3	111	163	42	105	10	5

[3] Week ended Friday.   [4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
February, 1931										
Colorado	10	37	4		758		0	200	28	5
Mississippi	15	67	8,479	1,115	190	528	1	131	90	20
March, 1931										
Connecticut	6	33	112		3,065		0	277	0	2
Dist. of Columbia	15	61	12		950		0	127	0	1
Maine	3	12	183		214		0	143	0	4
Massachusetts	8	201	65		2,023		3	1,637	0	9
North Dakota	1	19	21		156		1	106	35	4
Porto Rico		33	1,021	1,834	38	3	0		0	26
Tennessee	62	57	1,958	33	1,651	26	0	561	73	28

February, 1931	Cases
Chicken pox:	
Colorado	321
Mississippi	1,092
Dengue:	
Mississippi	8
Dysentery:	
Mississippi (amebic)	27
Mississippi (bacillary)	170
German measles:	
Colorado	3
Hookworm disease:	
Mississippi	233
Impetigo contagiosa:	
Colorado	2
Jaundice:	
Colorado	1
Mumps:	
Colorado	207
Mississippi	348
Ophthalmia neonatorum:	
Colorado	1
Mississippi	14
Puerperal septicemia:	
Mississippi	39
Rabies in animals:	
Mississippi	10
Trachoma:	
Mississippi	7
Undulant fever:	
Colorado	1

	Cases
Vincent's angina:	
Colorado	3
Whooping cough:	
Colorado	169
Mississippi	442

March, 1931

	Cases
Anthrax:	
Massachusetts	1
Porto Rico	7
Chicken pox:	
Connecticut	392
District of Columbia	204
Maine	216
Massachusetts	1,050
North Dakota	154
Porto Rico	32
Tennessee	413
Conjunctivitis:	
Connecticut	7
Dysentery:	
Porto Rico	18
Tennessee	3
Filariasis:	
Porto Rico	4
German measles:	
Connecticut	23
Maine	7
Massachusetts	483
Tennessee	6
Lead poisoning:	
Connecticut	3
Massachusetts	4
Lethargic encephalitis:	
Connecticut	1
Massachusetts	6
Tennessee	1
Mumps:	
Connecticut	327
Maine	262
Massachusetts	683
North Dakota	117
Porto Rico	5
Tennessee	159
Ophthalmia neonatorum:	
Massachusetts	145
Porto Rico	4
Tennessee	2
Paratyphoid fever:	
Porto Rico	2
Puerperal septicemia:	
Porto Rico	10
Tennessee	4
Rabies in animals:	
Connecticut	5
Rabies in man:	
Massachusetts	1
Scabies:	
North Dakota	6
Septic sore throat:	
Connecticut	9
Maine	1
Massachusetts	26
Tennessee	15
Tetanus:	
Porto Rico	8
Tennessee	1
Tetanus, infantile:	
Porto Rico	9
Trachoma:	
Maine	1
Massachusetts	3
Porto Rico	5
Tennessee	5
Trichinosis:	
Massachusetts	1
Tularaemia:	
Tennessee	1
Undulant fever:	
Connecticut	2
Massachusetts	3
North Dakota	1
Tennessee	1
Vincent's angina:	
Maine	7
North Dakota	56
Tennessee	11
Whooping cough:	
Connecticut	396
District of Columbia	85
Maine	176
Massachusetts	877
North Dakota	60
Porto Rico	236
Tennessee	169

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,340,000. The estimated population of the 89 cities reporting deaths is more than 31,795,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended April 4, 1931, and April 5, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	852	1,181	
96 cities	340	496	841
Measles:			
45 States	19,091	16,844	
96 cities	7,202	6,329	
Meningococcus meningitis:			
45 States	153	275	
96 cities	86	150	
Poliomyelitis:			
46 States	19	21	
Scarlet fever:			
46 States	5,731	4,855	
96 cities	2,372	1,881	1,537
Smallpox:			
46 States	1,008	1,673	
96 cities	86	146	65
Typhoid fever:			
46 States	115	156	
96 cities	23	28	27
Deaths reported			
Influenza and pneumonia:			
89 cities	1,188	1,040	
Smallpox.			
89 cities	0	0	

City reports for week ended April 4, 1931

The "estimated expectancy" given for diptheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years It is in most instances the median number of cases reported in the corresponding weeks of the preceding years When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	4	0	0		0	0	7	1
New Hampshire:								
Concord	0	0	0		0	4	0	0
Manchester	0	0	0		2	0	0	3
Nashua	0	0	0		0	10	0	0
Vermont:								
Barre	1	0	0		0	0	0	0
Burlington	0	0	1		0	0	0	0
Massachusetts:								
Boston	49	30	15	3	0	105	9	11
Fall River	2	3	2		0	3	9	2
Springfield	0	3	0		0	7	15	0
Worcester	7	4	0		0	6	17	7
Rhode Island:								
Pawtucket	1	1	0		0	0	0	2
Providence	0	8	2		0	28	4	14
Connecticut:								
Bridgeport	1	5	0		0	2	1	4
Hartford	0	4	0		0	17	1	4
New Haven	17	0	0		1	288	6	2

City reports for week ended April 4, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MIDDLE ATLANTIC								
New York:								
Buffalo	5	11	6	3	0	240	45	26
New York	304	250	77	52	17	1,331	67	283
Rochester	7	8	0	2	0	6	4	5
Syracuse	17	4	2	----------	0	9	1	1
New Jersey:								
Camden	5	5	3	----------	0	37	7	7
Newark	104	16	9	4	0	32	7	16
Trenton	5	3	0	1	0	1	3	10
Pennsylvania:								
Philadelphia	102	60	6	16	11	976	20	100
Pittsburgh	54	15	5	10	9	113	35	42
Reading	9	3	0	----------	1	51	16	8
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	9	8	3	1	5	103	30	12
Cleveland	158	26	11	20	4	48	251	34
Columbus	30	3	2	9	2	9	3	2
Toledo	13	3	2	4	4	1	23	17
Indiana:								
Fort Wayne	1	2	10	----------	0	40	0	2
Indianapolis	26	4	0	----------	1	279	2	17
South Bend	----------	0	----------	----------	----------	----------	----------	----------
Terre Haute	1	0	0	----------	0	1	0	2
Illinois:								
Chicago	106	95	60	13	8	375	61	74
Springfield	5	1	1	----------	0	220	12	3
Michigan:								
Detroit	123	42	15	10	5	16	57	41
Flint	20	2	0	5	0	0	8	2
Grand Rapids	0	1	0	----------	0	13	0	1
Wisconsin:								
Kenosha	6	0	0	----------	0	0	72	0
Madison	27	1	2	----------	0	1	15	----------
Milwaukee	119	13	3	4	4	85	342	5
Racine	6	2	0	----------	0	8	5	1
Superior	14	0	0	----------	0	0	0	1
WEST NORTH CENTRAL								
Minnesota:								
Duluth	2	0	0	----------	0	0	1	0
Minneapolis	25	12	3	----------	2	27	31	10
St. Paul	36	7	0	2	2	29	1	7
Iowa:								
Davenport	0	0	0	----------	----------	1	0	----------
Des Moines	2	1	0	----------	----------	1	0	----------
Sioux City	16	1	0	----------	----------	5	22	----------
Waterloo	7	0	0	----------	----------	1	0	----------
Missouri:								
Kansas City	35	4	3	----------	0	142	3	13
St. Joseph	2	1	2	----------	0	13	0	7
St. Louis	21	36	10	7	----------	60	15	----------
North Dakota:								
Fargo	2	0	0	----------	0	----------	11	0
Grand Forks	1	0	2	----------	----------	0	1	----------
South Dakota:								
Aberdeen	17	0	0	----------	----------	5	0	----------
Sioux Falls	0	0	0	----------	----------	0	0	----------
Nebraska:								
Omaha	8	2	4	----------	0	0	17	10
Kansas:								
Topeka	1	1	0	2	0	1	15	1
Wichita	9	1	0	----------	0	0	0	3
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	3	0	----------	0	67	6	6
Maryland:								
Baltimore	92	23	8	5	2	1,032	26	40
Cumberland	0	0	0	----------	0	0	0	2
Frederick	1	0	0	----------	0	4	0	0
District of Columbia:								
Washington	32	11	6	4	3	327	0	17
Virginia:								
Lynchburg	32	1	1	----------	0	9	0	1
Norfolk	24	2	1	----------	0	110	6	2
Richmond	1	2	0	----------	2	204	0	3
Roanoke	7	0	0	----------	3	5	0	1

City reports for week ended April 4, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
SOUTH ATLANTIC—con.								
West Virginia:								
Charleston	2	0	1	6	1	2	2	2
Wheeling	18	1	0	----------	0	2	0	2
North Carolina:								
Raleigh	10	0	0	----------	0	22	0	0
Wilmington	3	0	1	----------	0	0	0	1
Winston-Salem	8	0	0	----------	0	47	7	3
South Carolina:								
Charleston	0	0	3	73	0	13	0	5
Columbia	2	0	0	----------	1	1	8	5
Georgia:								
Atlanta	3	2	2	60	2	26	2	11
Brunswick	0	0	0	----------	0	0	18	1
Savannah	4	1	0	25	4	3	12	2
Florida:								
Miami	13	3	1	2	0	6	0	2
Tampa	8	1	2	1	2	104	0	1
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0	----------	0	29	1	3
Tennessee:								
Memphis	22	4	1	----------	8	67	6	10
Nashville	3	0	0	----------	7	99	0	6
Alabama:								
Birmingham	5	2	2	14	5	63	3	7
Mobile	0	1	2	----------	0	0	0	1
Montgomery	3	0	0	2	----------	0	10	----------
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	2	0	0	----------	----------	2	0	----------
Little Rock	0	1	0	----------	0	0	1	9
Louisiana:								
New Orleans	20	11	19	1	3	1	0	18
Shreveport	3	0	0	----------	0	0	0	5
Oklahoma:								
Muskogee	0	0	0	5	----------	0	3	----------
Texas:								
Dallas	54	5	2	4	7	2	36	21
Fort Worth	5	2	5	----------	2	0	0	5
Galveston	1	0	0	----------	1	3	0	3
Houston	3	4	2	----------	1	11	0	7
San Antonio	2	3	2	----------	8	7	0	6
MOUNTAIN								
Montana:								
Billings	5	0	0	----------	1	0	0	1
Great Falls	----------	0	----------	----------	----------	----------	----------	----------
Helena	0	0	0	1	0	0	0	0
Missoula	0	0	0	----------	0	0	0	1
Idaho:								
Boise	3	0	0	----------	0	0	0	0
Colorado:								
Denver	59	7	5	----------	1	19	33	13
Pueblo	2	1	0	----------	0	56	0	1
New Mexico:								
Albuquerque	17	0	0	3	3	2	0	0
Arizona:								
Phoenix	0	1	0	----------	0	0	0	1
Utah:								
Salt Lake City	1	2	0	----------	1	1	12	2
Nevada:								
Reno	0	0	0	----------	0	0	0	0
PACIFIC								
Washington:								
Seattle	41	2	0	----------	----------	2	10	----------
Spokane	6	2	1	----------	----------	5	0	----------
Tacoma	7	1	4	----------	2	0	2	3
Oregon:								
Portland	18	7	0	5	1	19	8	9
Salem	4	0	0	----------	0	5	4	0
California:								
Los Angeles	63	38	15	40	2	171	6	15
Sacramento	5	1	1	9	1	2	2	2
San Francisco	40	15	6	33	1	3	0	2

City reports for week ended April 4, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases, reported	Cases, estimated expectancy	Cases, reported	Deaths, reported		Cases, estimated expectancy	Cases, reported	Deaths, reported		
NEW ENGLAND											
Maine:											
Portland	4	12	0	0	0	1	0	0	0	12	25
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	12
Manchester	2	0	0	0	0	0	0	0	0	0	17
Nashua	0	0	0	0	0	0	0	0	0	0	--------
Vermont:											
Barre	0	0	0	0	0	1	0	0	0	1	5
Burlington	2	0	0	0	0	0	0	0	0	3	9
Massachusetts:											
Boston	87	127	0	0	0	10	0	1	0	41	221
Fall River	6	12	0	0	0	2	0	0	0	2	33
Springfield	9	3	0	0	0	3	0	0	0	1	41
Worcester	10	28	0	0	0	2	0	0	0	7	53
Rhode Island:											
Pawtucket	2	11	0	0	0	0	0	0	0	2	17
Providence	13	34	0	0	0	2	0	0	0	5	69
Connecticut:											
Bridgeport	10	6	0	0	0	0	0	0	0	0	32
Hartford	6	4	0	0	0	1	0	0	0	1	31
New Haven	9	3	0	0	0	0	0	0	0	1	34
MIDDLE ATLANTIC											
New York:											
Buffalo	30	14	1	0	0	6	0	0	0	23	159
New York	361	511	1	0	0	100	8	3	0	131	1,737
Rochester	11	95	0	0	0	2	0	0	0	11	76
Syracuse	12	36	0	0	0	0	0	0	0	18	47
New Jersey:											
Camden	6	2	0	0	0	1	0	0	0	0	35
Newark	39	51	0	0	0	6	0	1	0	33	115
Trenton	5	8	0	0	0	2	0	1	0	0	51
Pennsylvania:											
Philadelphia	103	148	0	0	0	25	2	1	1	27	518
Pittsburgh	30	34	0	0	0	13	0	1	0	18	201
Reading	5	4	0	0	0	4	0	0	0	0	44
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	21	43	1	0	0	11	0	0	0	2	151
Cleveland	40	67	1	0	0	14	0	0	0	19	236
Columbus	12	7	1	0	0	5	0	0	0	0	97
Toledo	16	3	1	1	0	8	1	0	0	4	79
Indiana:											
Fort Wayne	5	1	1	1	0	0	1	0	0	1	34
Indianapolis	11	47	7	8	0	5	0	0	0	27	--------
South Bend	4	--------	0	--------	--------	--------	0	--------	--------	--------	--------
Terre Haute	2	3	0	0	0	1	0	0	0	0	19
Illinois:											
Chicago	132	259	2	1	0	52	1	0	0	30	729
Springfield	2	5	0	0	0	0	0	0	0	0	28
Michigan:											
Detroit	116	140	1	0	0	19	0	0	0	60	315
Flint	13	17	2	1	0	1	0	0	0	6	19
Grand Rapids	10	11	0	1	0	1	0	1	1	15	27
Wisconsin:											
Kenosha	2	2	1	0	0	0	0	0	0	1	5
Madison	3	5	0	1	--------	--------	0	0	--------	3	--------
Milwaukee	28	11	0	1	0	6	0	0	0	14	109
Racine	4	4	0	0	0	0	0	0	0	19	15
Superior	4	1	0	0	0	0	0	0	0	0	7
WEST NORTH CENTRAL											
Minnesota:											
Duluth	0	0	0	0	0	1	0	0	0	0	14
Minneapolis	39	8	1	0	0	0	0	1	0	2	100
St. Paul	32	12	0	0	0	2	0	1	0	6	70

City reports for week ended April 4, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases, reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases, reported	Smallpox: Deaths, reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases, reported	Typhoid fever: Deaths, reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—con.											
Iowa:											
Davenport	2	1	1	6	--------	-------	0	0	--------	0	--------
Des Moines	11	4	2	8	--------	-------	0	0	--------	0	25
Sioux City	0	17	1	1	--------	-------	0	0	--------	3	--------
Waterloo	2	2	0	0	--------	-------	0	0	--------	3	--------
Missouri											
Kansas City	25	9	2	0	0	8	0	0	0	6	113
St. Joseph	2	17	0	0	0	0	0	0	0	0	24
St. Louis	34	225	2	3	0	9	1	0	3	5	289
North Dakota:											
Fargo	1	0	0	0	0	0	0	0	0	2	1
Grand Forks	2	0	0	0	--------	-------	0	0	-------	2	--------
South Dakota:											
Aberdeen	1	0	0	0	--------	-------	0	0	--------	0	--------
Sioux Falls	2	0	0	0	--------	-------	0	0	--------	0	10
Nebraska:											
Omaha	4	12	3	15	0	4	0	0	0	2	56
Kansas.											
Topeka	4	3	1	1	0	0	0	0	0	2	15
Wichita	5	1	2	21	0	2	0	0	0	1	33
SOUTH ATLANTIC											
Delaware:											
Wilmington	5	9	0	6	0	1	0	0	0	0	34
Maryland:											
Baltimore	37	37	0	0	0	14	2	3	2	9	244
Cumberland	0	0	0	0	0	0	0	0	0	0	19
Frederick	0	1	0	0	0	0	0	0	0	0	3
District of Col.:											
Washington	25	23	1	0	0	12	1	0	0	7	139
Virginia:											
Lynchburg	0	0	0	0	0	1	0	0	0	0	15
Norfolk	1	2	0	0	0	1	0	0	0	1	--------
Richmond	3	3	0	0	0	1	0	0	0	0	58
Roanoke	1	0	0	0	0	0	0	0	0	2	21
West Virginia											
Charleston	1	5	0	0	0	0	0	1	0	0	17
Wheeling	2	1	0	0	0	1	1	0	0	2	12
North Carolina:											
Raleigh	1	1	1	0	0	0	0	0	0	20	13
Wilmington	0	0	1	0	0	4	0	0	0	0	11
Winston-Salem	1	1	1	0	0	0	0	0	0	7	20
South Carolina.											
Charleston	0	1	0	0	0	1	0	2	1	0	26
Columbia	0	0	0	0	0	1	0	0	0	0	31
Georgia:											
Atlanta	5	62	2	1	0	2	0	1	0	2	74
Brunswick	0	0	0	0	0	0	0	0	0	0	4
Savannah	0	3	0	0	0	2	1	0	0	0	27
Florida:											
Miami	1	1	0	0	0	2	0	6	0	0	21
St. Petersburg	0	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Tampa	1	0	0	0	0	2	2	0	0	0	26
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	4	0	0	0	1	0	0	0	0	22
Tennessee:											
Memphis	10	51	2	2	0	6	1	0	0	8	112
Nashville	3	5	0	0	0	2	0	0	0	1	69
Alabama:											
Birmingham	3	7	1	0	0	4	1	0	0	7	102
Mobile	1	0	0	0	0	2	0	0	0	0	18
Montgomery	0	1	0	0	--------	-------	0	0	--------	0	--------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0	--------	-------	0	0	--------	0	--------
Little Rock	1	5	0	0	0	3	0	0	0	0	--------

City reports for week ended April 4, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases, reported	Cases, estimated expectancy	Cases, reported	Deaths, reported		Cases, estimated expectancy	Cases, reported	Deaths, reported		
WEST SOUTH CENTRAL—con.											
Louisiana											
New Orleans	8	15	0	18	0	17	2	2	1	8	161
Shreveport	1	1	0	1	0	1	0	0	0	1	38
Oklahoma:											
Muskogee	0	1	2	0	--------	--------	0	0	--------	0	--------
Texas:											
Dallas	5	2	3	0	0	2	0	1	1	6	76
Fort Worth	3	3	4	2	0	2	0	0	0	0	43
Galveston	0	0	0	0	0	2	0	0	0	0	23
Houston	1	5	2	2	0	4	0	0	0	0	61
San Antonio	1	0	1	0	0	5	0	0	0	0	63
MOUNTAIN											
Montana:											
Billings	0	1	0	0	0	0	0	0	0	2	6
Great Falls	2	--------	1	--------	--------	--------	0	--------	--------	--------	--------
Helena	0	0	0	0	0	0	0	0	0	0	2
Missoula	0	0	0	0	0	0	0	0	0	0	4
Idaho:											
Boise	0	0	0	0	0	1	0	0	0	0	2
Colorado:											
Denver	13	12	0	0	0	3	0	0	0	26	94
Pueblo	2	0	0	0	0	1	0	1	0	16	12
New Mexico:											
Albuquerque	0	0	0	0	0	7	0	0	0	3	13
Arizona:											
Phoenix	1	5	1	0	0	8	0	0	0	0	--------
Utah:											
Salt Lake City	3	2	1	0	0	2	0	0	0	41	29
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	--------
PACIFIC											
Washington:											
Seattle	9	10	2	3	--------	--------	0	0	--------	33	--------
Spokane	7	5	7	4	--------	--------	0	0	--------	4	--------
Tacoma	2	7	4	0	0	2	0	0	0	5	27
Oregon:											
Portland	5	1	10	1	0	3	0	0	1	0	71
Salem	0	0	0	0	0	0	0	0	0	1	--------
California:											
Los Angeles	39	20	4	1	0	26	1	0	0	7	233
Sacramento	3	1	0	0	0	3	0	1	0	5	30
San Francisco	23	4	1	0	0	9	1	0	0	22	151

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
NEW ENGLAND									
Massachusetts:									
Boston	2	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
New York	13	11	3	0	0	0	1	0	0
New Jersey:									
Camden	0	1	0	0	0	0	0	0	0
Newark	1	0	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	5	5	1	0	1	1	0	0	0
Pittsburg	0	1	0	1	0	0	0	0	0

City reports for week ended April 4, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	0	0	0	0	0	0	0	0
Indiana:									
Indianapolis	3	4	0	0	0	0	0	0	0
Illinois:									
Chicago	16	6	0	0	0	0	0	0	0
Michigan:									
Detroit	8	5	0	0	0	0	0	0	0
Wisconsin:									
Milwaukee	1	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	0	0	0	0	0	0	0	1	0
Missouri.									
Kansas City	2	2	0	0	0	1	0	0	0
St. Louis	5	5	1	0	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	2	0	0	1	0	0	0	0	0
District of Columbia:									
Washington	4	2	0	0	0	0	1	0	0
Virginia:									
Richmond	0	0	0	1	0	0	0	0	0
Roanoke	0	0	0	0	0	1	0	0	0
West Virginia:									
Charleston	1	0	0	0	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	0	1	0	0	0
Winston-Salem	0	1	0	0	1	2	0	0	0
South Carolina:									
Charleston	0	0	0	0	7	0	0	0	0
Columbia	1	0	0	0	0	0	0	0	0
Georgia:									
Atlanta	2	1	0	0	1	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	7	1	0	0	0	0	0	0	0
Nashville	1	1	0	0	0	0	0	0	0
Alabama:									
Birmingham	5	2	0	0	0	0	0	0	0
Mobile	0	0	0	0	0	1	0	0	0
Montgomery	0	0	0	0	4	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	2	1	0	0	0	0	0	0	0
Shreveport	0	0	0	0	0	1	0	0	0
Texas:									
Dallas	0	0	0	0	1	0	0	0	0
Houston	0	0	0	0	0	1	0	0	0
San Antonio	0	1	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Seattle	1	0	0	0	0	0	0	0	0
California:									
Los Angeles	2	2	0	0	0	0	0	0	0
Sacramento	1	0	0	0	0	0	0	0	0
San Francisco	0	0	0	0	0	1	0	0	0

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended April 4, 1931, compared with those for a like period ended April 5, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities March 1 to April 4, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930	Mar. 28, 1931	Mar. 29, 1930	Apr. 4, 1931	Apr. 5, 1930
98 cities	73	88	65	101	[2] 65	97	78	82	[3] 53	79
New England	106	92	79	92	67	65	70	56	46	68
Middle Atlantic	61	85	67	94	64	97	63	80	48	74
East North Central	75	94	72	134	[4] 73	132	82	114	[4] 65	107
West North Central	71	118	63	110	73	74	163	64	42	52
South Atlantic	93	78	53	104	73	90	61	70	47	64
East South Central	29	36	35	24	[5] 8	36	76	48	29	30
West South Central	118	143	68	111	71	136	64	125	85	139
Mountain	61	88	26	26	[6] 19	88	87	44	[7] 46	26
Pacific	63	38	55	63	51	45	69	34	53	51

MEASLES CASE RATES

	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930	Mar. 28, 1931	Mar. 29, 1930	Apr. 4, 1931	Apr. 5, 1930
98 cities	760	620	946	646	[2] 1,027	776	1,208	879	[3] 1,126	1,004
New England	909	593	1,346	743	1,527	1,030	1,479	1,117	1,106	1,449
Middle Atlantic	874	417	1,026	396	1,158	539	1,321	611	1,250	789
East North Central	869	442	583	471	[4] 566	538	723	654	[4] 736	799
West North Central	643	938	595	781	492	994	650	908	532	860
South Atlantic	2,238	535	2,753	481	3,442	617	3,879	697	3,808	867
East South Central	1,036	717	1,146	634	[5] 1,073	1,291	1,635	968	1,501	526
West South Central	68	505	37	617	51	547	47	784	88	731
Mountain	1,332	2,106	1,462	2,449	[6] 219	2,800	1,140	2,987	[7] 696	4,731
Pacific	347	1,581	356	1,881	394	1,800	519	2,184	358	2,008

SCARLET FEVER CASE RATES

	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930	Mar. 28, 1931	Mar. 29, 1930	Apr. 4, 1931	Apr. 5, 1930
98 cities	345	321	375	337	[2] 385	316	402	308	[3] 371	301
New England	527	431	589	426	676	372	697	363	577	462
Middle Atlantic	359	283	389	327	392	294	454	299	404	293
East North Central	346	448	399	461	[4] 400	418	378	383	[4] 380	377
West North Central	492	345	518	308	589	335	580	306	585	271
South Atlantic	354	206	310	210	342	286	310	272	290	276
East South Central	401	173	477	96	[5] 231	179	559	233	396	143
West South Central	71	139	95	167	101	108	78	111	95	157
Mountain	805	300	400	379	[6] 323	352	209	458	[7] 137	238
Pacific	121	241	96	229	110	202	104	204	92	168

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are extimates as of July 1, 1931 and 1930, respectively.
[2] South Bend, Ind., Memphis, Tenn., and Pueblo, Colo., not included.
[3] South Bend, Ind., and Great Falls, Mont., not included
[4] South Bend, Ind., not included
[5] Memphis, Tenn., not included.
[6] Pueblo, Colo., not included
[7] Great Falls, Mont., not included.

*Summary of weekly reports from cities March 1 to April 4, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—*Continued

SMALLPOX CASE RATES

	Week ended—									
	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930	Mar. 28, 1931	Mar. 29, 1930	Apr. 4, 1931	Apr. 5, 1930
98 cities	13	25	19	25	[2] 21	24	17	22	[3] 13	23
New England	0	2	0	0	0	0	0	2	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	15	24	9	30	[4] 8	20	7	17	[4] 8	30
West North Central	57	79	132	70	130	97	99	99	78	87
South Atlantic	0	2	0	4	0	2	4	8	2	2
East South Central	23	18	0	24	[5] 8	6	12	18	12	0
West South Central	47	63	61	24	95	49	78	45	71	17
Mountain	17	9	17	9	[6] 10	35	44	26	[7] 0	106
Pacific	12	105	41	115	43	103	22	71	16	71

TYPHOID FEVER CASE RATES

	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930	Mar. 28, 1931	Mar. 29, 1930	Apr. 4, 1931	Apr. 5, 1930
98 cities	4	8	3	6	[2] 4	8	4	8	[3] 4	4
New England	5	2	0	5	2	0	2	2	2	5
Middle Atlantic	3	4	2	5	2	6	2	15	3	3
East North Central	1	2	2	1	[4] 2	1	2	3	[4] 1	2
West North Central	11	8	0	4	8	10	2	4	4	2
South Atlantic	12	40	6	12	16	14	12	6	14	4
East South Central	17	12	17	24	[5] 0	84	0	30	0	30
West South Central	0	31	14	7	10	10	7	7	10	10
Mountain	0	0	0	53	[6] 0	18	0	0	[7] 9	18
Pacific	2	6	4	10	8	10	10	2	2	6

INFLUENZA DEATH RATES

	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930	Mar. 28, 1931	Mar. 29, 1930	Apr. 4, 1931	Apr. 5, 1930
91 cities	44	16	34	13	[2] 31	15	29	14	[3] 23	13
New England	19	19	36	2	19	2	14	10	2	7
Middle Atlantic	32	13	23	11	23	14	20	10	17	14
East North Central	48	12	28	9	[4] 28	9	25	11	[4] 18	10
West North Central	59	3	50	6	47	12	35	6	12	9
South Atlantic	73	36	57	18	49	28	32	16	39	8
East South Central	139	58	101	84	[5] 130	78	126	97	126	39
West South Central	52	32	55	43	35	25	55	32	69	36
Mountain	44	35	35	18	[6] 38	62	61	53	[7] 27	26
Pacific	34	2	36	2	34	7	41	2	14	0

PNEUMONIA DEATH RATES

	Mar. 7, 1931	Mar. 8, 1930	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930	Mar. 28, 1931	Mar. 29, 1930	Apr. 4, 1931	Apr. 5, 1930
91 cities	194	166	191	155	[2] 184	161	180	163	[3] 172	161
New England	185	220	147	169	183	218	156	220	127	181
Middle Atlantic	229	181	214	178	216	159	220	187	223	184
East North Central	160	141	139	127	[4] 132	148	125	117	[4] 121	146
West North Central	218	129	159	144	215	123	171	135	150	117
South Atlantic	265	222	332	196	269	222	263	212	221	196
East South Central	227	214	240	233	[5] 222	188	189	227	170	155
West South Central	148	160	206	142	180	199	211	164	238	164
Mountain	131	150	235	123	[6] 124	194	131	176	[7] 165	185
Pacific	101	75	125	65	101	77	98	92	53	62

[2] South Bend, Ind., Memphis Tenn., and Pueblo, Colo, not included.
[3] South Bend, Ind., and Great Falls, Mont., not included.
[4] South Bend, Ind., not included.
[5] Memphis, Tenn., not included.
[6] Pueblo, Colo., not included.
[7] Great Falls, Mont., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended March 28, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended March 28, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia	2	39			1	1
New Brunswick						1
Quebec	1	1		1		10
Ontario	3	7		1	3	3
Manitoba			1			1
Saskatchewan					8	1
Alberta [1]						
British Columbia	1		1			1
Total	7	47	2	2	12	27

[1] No case of any disease included in the table was reported during the week.

New Brunswick—Deaths from communicable diseases—Year ended October 31, 1930.—During the year ended October 31, 1930, deaths from certain communicable diseases were reported in the Province of New Brunswick, Canada, as follows:

Disease	Number of deaths	Death rate per 100,000	Disease	Number of deaths	Death rate per 100,000
Diphtheria	26	6.1	Scarlet fever	14	3.3
Influenza	16	3.7	Tuberculosis	357	84.2
Lethargic encephalitis	1	.2	Typhoid fever	20	4.7
Measles	15	3.5	Whooping cough	31	7.3
Poliomyelitis	3	.7			

Quebec Province—Communicable diseases—Week ended April 4, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended April 4, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Mumps	7
Chicken pox	66	Puerperal fever	2
Diphtheria	16	Scarlet fever	61
Erysipelas	8	Tuberculosis	43
German measles	4	Typhoid fever	15
Measles	188	Whooping cough	31

CUBA

Habana—Communicable diseases—March, 1931.—During the month of March, 1931, certain communicable diseases were reported in the city of Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal meningitis	1	1	Measles	53	
Chicken pox	48		Scarlet fever	5	
Diphtheria	11	1	Tuberculosis	28	2
Malaria [1]	4		Typhoid fever [1]	9	1

[1] Many of these cases are from the island of Cuba, outside of Habana.

DENMARK

Communicable diseases—January, 1931.—During the month of January, 1931, cases of certain communicable diseases were reported in Denmark as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	8	Paratyphoid fever	3
Chicken pox	69	Puerperal fever	19
Diphtheria and croup	482	Scabies	1,089
Erysipelas	298	Scarlet fever	143
German measles	8	Syphilis	152
Influenza	57,309	Tetanus	2
Lethargic encephalitis	8	Typhoid fever	11
Measles	2,161	Undulant fever (Bac. abort. Bang)	49
Mumps	460	Whooping cough	2,207

ITALY

Communicable diseases—Four weeks ended January 25, 1931.—During the four weeks ended January 25, 1931, cases of certain communicable diseases were reported in Italy as follows:

	Dec. 29, 1930–Jan. 4, 1931		Jan. 5–11, 1931		Jan. 12–18, 1931		Jan. 19–25, 1931	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	19	22			12	11	9	9
Cerebrospinal meningitis	9	8	9	9	4	4	11	11
Chicken pox	214	92	286	108	227	96	261	98
Diphtheria and croup	551	300	574	302	620	341	654	374
Dysentery	2	2	2	2	2	2	8	5
Lethargic encephalitis	1	1	6	6	7	7	5	5
Measles	1,274	227	1,419	238	1,272	260	1,998	285
Poliomyelitis	5	5	4	4	4	4	6	6
Scarlet fever	315	128	357	156	363	156	325	143
Typhoid fever	250	171	299	172	265	156	284	165

JAMAICA

Communicable diseases—Four weeks ended March 28, 1931—During the four weeks ended March 28, 1931, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island of Jamaica outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis	1	3	Puerperal fever		2
Chicken pox	5	7	Scarlet fever	2	13
Dysentery		7	Tuberculosis	14	73
Leprosy		3	Typhoid fever	15	41
Lethargic encephalitis		1			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931			February, 1931				March, 1931				Apr. 4, 1931
						17	24	31	7	14	21	28	7	14	21	28	
Ceylon: Colombo	C													1			
China:																	
Canton	C	1	1														
Shanghai	C	38	2														
	D	4															
India	C	36,529	18,944	11,112	10,687	2,504	4,022	4,275	3,533	3,529							
	D	17,635	9,782	5,933	5,689	1,770	2,165	2,231	1,957	1,846							
Bombay	C	16	19	13		20	1										1
	D	11	17	7		6	3										
Calcutta	C	24	33	22	28	36	29	24	32	27	33	43	65	80	102	129	
	D	15	16	16	20	25	19	19	23	22	25	26	39	49	68	69	
Karikal	C				1					4		1	4	2	1		
	D									4			4	2	1		
Madras	C	2	1		201	47	36	16		18	20	19	15	4		7	
	D	2			67	21	11	7	8	5	4	14	6	5		2	
Negapatam	D							1	2	1		2					
Rangoon	C	1			1												
	D	1			1	1											
Tuticorin	C	1	1	5	1	1					1						
	D	1	1														
India (French):																	
Chandernagor	C	3	1	1	2			1			1	2	2		2	2	
	D	1			3			1			1	3	1		3	1	
Pondicherry	C	1	1	4	31	9	4	3	3	10	20	31	39	29	25	26	20
	D	1		4	21	3	3	3	2	10	9	6	9	6	5	4	3
India (Portuguese)	C		14		1												
	D		9														
Indo-China (see also table below):																	
Pnompenh	C	2	1	2			1	2	1		3	3	3				
	D			2				2			1	2	2		1		
Saigon and Cholon	C	2	1	3	9	4	1		1			3	1	1		1	
	D			1	4	2	1					3	1	2	1	1	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931			February, 1931				March, 1931				Apr. 4, 1931
						17	24	31	7	14	21	28	7	14	21	28	
Philippine Islands: [1]																	
Ports—																	
Iloilo	C	1		1	1			2									
	D	4		3	1			2									
Manila	C	5															
	D	1															
Provinces—																	
Antique	C	40															
	D	18															
Bulacan	C	2															
	D	1															
Capiz	C							3	56	69	54	28	35	29	11	4	4
	D							2	45	55	39	23	29	24	10	4	3
Iloilo	C	50	30	45	28	11	41	36	57	27	42	10	16	2	5		
	D	40	23	27	22	9	27	25	49	21	22	11	11	2	2		
Masbate	C													21			
	D													9			
Negros, Occidental	C	28	56	163	120	19	32	33	6	1	1	2					
	D	20	41	123	97	15	17	19	5	1	1	2					
Negros, Oriental	C								1								
	D								1								
Samar	C	7	16	8	17												
	D	7	12	8	9												
Sorsogon	C		5														
	D		4														
Surigao	C	(?)															
Siam	C	4	4	6	2	2		1			1				4	4	2
	D	1	4	6	2	1									1	1	
Ayudhaya District	C																1
Bangkok	C	3	3	4	2	2		1		1			1		1	1	
	D	2	2	4	2	1							1		1	1	
Bisnulok Province	C														4	4	
	D														1	1	

Place		August, 1930	September, 1930	October, 1930	November, 1930			December, 1930			January, 1931			February, 1931	
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20
Indo-China (French) (see also table above):															
Annam [3]	C	3													
Cambodia [3]	C	59	38	22	8	1	17	28			7	19	36		35
Cochin-China [3]	C	27	33	28	5	5	3	8			7	4	13		5

PLAGUE

Place		Sept. 21-Oct 18, 1930	Oct. 19-Nov. 15, 1930	Nov. 16-Dec. 13, 1930	Dec. 14, 1930-Jan. 10, 1931	Week ended— January, 1931			February, 1931				March, 1931				April, 1931	
						17	24	31	7	14	21	28	7	14	21	28	4	11
Algeria:																		
Algiers	C	6	11	2	1	1		1		1							1	
	D		3														1	
Bone	C							1										
Constantine, vicinity of	C		1		50			1		1								
	D							1										
Oran	C	10	2															
	D	3	1															
Plague-infected rats		6	1															
Philippeville	C	3	2		1													
	D	1			1													
Argentina:																		
Cordoba Province	C						1				1							
Entre Rios Province—Diamante	C											2						
Jujuy Province—Palpala	C							1			1							
Santa Fe	C										2							
Belgian Congo	C		1	1											2			
	D		1	1											2			

1 Fugures for cholera in the Philippine Islands are subject to correction.
2 During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, P. I.
3 Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931			February, 1931				March, 1931				April, 1931	
						17	24	31	7	14	21	28	7	14	21	28	4	11
British East Africa (see also table below):																		
Tanganyika	C			3	2							15	7					
	D			3	2							4						
Uganda	C	165	171	111	67	7	8	2	8	6								
	D	164	168	112	67	6	8	2	8	6								
Ceylon: Colombo	C	3	1	9	9	1	1	1	5	6	2	1	2	1	3	3		
	D	3	1	8	9		1	1	4	7	2	1	3	1	3	2		
Plague-infected rats			1	2				1	1	1	1	1			3	1		
China:																		
Manchuria—Tungliau and Nungan	C	1																
Shensi	C		1															
Dutch East Indies:																		
Batavia and West Java	C	107	143	208	239	56	57	37	30	29	36							
	D	103	145	206	238	54	53	37	24	29	35							
East Java and Madura	C								4									
	D								4									
Java and Madura	D	335	501	557	615	142	102	98	85	89	100	99	80					
Egypt:																		
Alexandria	C	9	7	4	3				1	1			1	1				
	D	6	7	1														
Plague-infected rats				3	1		1				1							
Assiout	C		3	9	7	2	19	2	3	9		17	15	6	10	1	1	5
	D		1	1	1	2	2	2		4		3	4		4	1	1	
Aswan	C			3														
Beni-Suef	C					1												
	D					1												
Cairo	C																1	
Deirout	C						19	2		6	10							
	D						2	2			4							
Gharbieh	C							1										
	D							1										
Girga	C				7				1						14	37	35	31
	D				2				1						2	5	17	13
Kena	C															5		
	D															2		

Manfalut	C				23	5	21	4		11		2	2	3	5	9		
	D				5	2	3	1		4		1			2	1		
Minieh	C			1			1	1							2	1		
	D							1							1	1		
Port Said	C		2															
France: Marseille	C	4	4															
Greece (see also table below): Pyrgos	C	2																
India	C	2,371	2,721	3,259	3,740	1,169	1,279	1,438	1,449	1,270								
	D	1,068	1,497	1,856	2,226	837	737	957	891	862								
Bassein	C		1		2	1		1	2				1					
	D				1	1			2	1								
Bombay	C	2	1				1			1				1	1	1		
	D	2	1				1			1					2	1		
Plague-infected rats		64	30	32	38	10	6	9	9	14		8	10	17	14	21		
Madras Presidency	C	196	185	148	220	73	99	75	65	30	19							
	D	110	124	78	154	47	53	39	43	17	18							
Rangoon	C	2	2		2		2									1		
	D	2	1		1		1									1		
Plague-infected rats		1	1	4	2	2	1	1			8							
India (Portuguese)	C		3															
	D		3															
Indo-China (see also table below):																		
Pnompenh	C	2		6	1	1	3	2	1				1					
	D	3	1	6	1	1	3	2	1		1	2	1	2	1	1		
Saigon and Cholon	C	1																
Iraq: Baghdad	C	1	P	4			2	3				1	2	1	3	3	1	
	D	1		2			2	2					2		3	1	1	
Madagascar (see also table below): Tamatave	C	1	5	4	2		5	4										
	D	1	3	3														
Morocco	C		5		19	13												
	D				8	4												
Nigeria: Lagos	C	5	38	9	5				1									
	D	5	5	9	5				1									
Plague-infected rats		11	13	5	5													
Peru (see table below).																		
Senegal (see table below).																		
Siam	C	1	6						4	5	9	3	1					
	D		5						2	4	6	4						
Bangkok	C		1	1	3		4	4		1	2	3		29				
	D		1	1	3		4	3	1		1	4		6				
Nagara Rajsima	C	1	1	11	17	3	2	1	3	7								
	D	1	1	9	10	2	3	1	4	6								
Syria: Beirut	C		6		1				1		1							
Tripolitania	C		1	13		2	2	1	3		1			1				
	D			1		2			1									
Tunisia: Tunis	C		1	P	13	1					9	2	3		5			
	D										7							
Union of Socialist Soviet Republics:																		
Gourandus	D							28										
Transcaucasia—Karabakh	C						6											

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended—												
						January, 1931			February, 1931				March, 1931				April, 1931	
						17	24	31	7	14	21	28	7	14	21	28	4	11
Union of South Africa:																		
Cape Province	C		1	P														
Orange Free State	C				2				P	P	1	P						
	D				2						1							
On vessel: S. S. Marionga de Thermiotis at Avonmouth	C				1													

Place		Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931
British East Africa (see also table above):							
Kenya	C	87	53	58	62	50	69
Greece (see also table above)	C			2			
Indo-China (see also table above)	C	2	5	2	5	1	
Madagascar (see also table above):							
Ambositra Province	C			4	44	95	100
	D			4	44	87	96
Antsirabe Province	C	11	21	3	18	27	66
	D	11	21	3	18	26	57
Miarinarivo Province	C	2	7	18	12	18	28
	D	2	7	18	12	18	26
Moramanga Province	C	27	18	20	19	13	7
	D	27	17	20	19	11	5
Tananarive Province	C	39	79	125	170	178	92
	D	38	79	116	164	172	89

Place		Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931
Peru	C	21	10	42	34	8	
	D	8	2	20	14		
Senegal.							
Baol [1]	C	79	48	53			
	D	20	23	35	4		
Dakar [1]	C	108	3				
	D	90	8				
Louga [1]	C	75	61	37	10		
	D	33	30	25	3		
Thies [1]	C	34	12	24	27	2	
	D	20	4	15	23	1	
Tivaouane [1]	C	110	20	53	31	2	
	D	54	14	31	25	1	

SMALLPOX

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931: 17	January, 1931: 24	January, 1931: 31	February, 1931: 7	February, 1931: 14	February, 1931: 21	February, 1931: 28	March, 1931: 7	March, 1931: 14	March, 1931: 21	March, 1931: 28	Apr. 4, 1931
Algeria:																	
Algiers	C				1				1		1					2	
Bone	C							1									
Constantine	C		1												1		
Oran	C			3													
Arabia: Aden	C								1	1							
Belgian Congo	C				79	27	23										
Belgium	C									1							
Brazil:																	
Porto Alegre (alastrim)	C	26	28	36			3										
Rio de Janeiro	C		2														
British East Africa (see also table below)[1] Tanganyika	C	95	17	385	84	21	25	18	6	35	42						
	D	6	1	36	4	1	1	2	1		12						
British South Africa: Southern Rhodesia	C	153	95	18	18	2	1										
	D			3													
Canada:																	
Alberta	C	22		1	19		7			1							
British Columbia—Vancouver	C	2	3	1	3				2	1	2	5					
Manitoba	C							1				1					
Winnipeg	C				1							1					
Nova Scotia	C							1								1	
Ontario	C	19	59	23	17	10	3	32	4	10	4	7	8	2	3	3	1
Kingston	C				6	1					1						
North Bay	C				2					1							
Ottawa	C		37	12	2	1	1	1			1						
Sault Ste. Marie	C				1	11	8	5	6			2					
Toronto	C			4										1		1	
Quebec	C			2			2										
Saskatchewan	C	3	2	18		7	6	5	20	17	18	18	10	40	10	8	
Regina	C										1					2	
Canary Islands: Las Palmas	C															1	
China.																	
Canton	C									2			1	1	2	2	
Chungking	C	P	P	P	2												
Foochow	C	P	P	P	P		P		P		P		P				
Hong Kong	C				1		1			2	5		2			1	
	D									1	1	1				2	

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases, D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec 14, 1930–Jan 10, 1931	Week ended— January, 1931 17	24	31	February, 1931 7	14	21	28	March, 1931 7	14	21	28	Apr. 4, 1931
China—Continued.																	
Manchuria—																	
Harbin	C		1					1									
Kwantung—Dairen	C			4	1											2	
	D			1													
Nanking	C	P	P	P	P	P		P	P	P	P	P	P				
Shanghai—																	
Foreigners only	C	1	2	8	14	1	1	6	4	4	7	2	3	3	1	1	
Including natives	D		1	4	11	2	4	4	3	5	2	4	3	5	2	2	1
Swatow	D	4	3	3	5	1	1	3	2		3	3	7	3	6	6	
Tientsin	C	1	1	2		1											
Chosen (see table below).																	
Colombia: Cali	D	2		1													
Dutch East Indies:																	
Java—Batavia and West Java	C	14	26	6	4		28		1					1			
	D	4	1	2	2		1		1	1							
Sanggi Islands	C		29														
	D		3														
France (see table below).																	
Great Britain:																	
England and Wales	C	325	372	508	665	187	272	286	213	221	50	247	227	171	219		
Bradford	C	1	1	1	1		1		3		1						
Cardiff	C	1															
Leeds	C	1	2		2												
London	C	29	172	184	161	45	47	33	24	23	16	23	36	26	54		
London and Great Towns	C	52	296	433	590	154	198	194	147	150	186	189	158	117	154		
	D		1	1							1						
Sheffield	C						1	1	1		16	6	10	2	1		
Stoke-on-Trent	C		1				1						1				
Greece (see table below).																	
Honduras:																	
Amapala	C												1				
Ocotopeque and Gracias districts	C												P				
Puerto Castilla	C				4	7	1		3	3							

India	C	2,[illegible]22	2,412	3,627	5,623	2,068	2,390	2,477	2,682	2,996							
	D	572	606	874	1,381	497	486	523	739	665							
Bombay	C	1		1	2	2	2	2	1		1	3	2	4	1	4	
	D			1	2			1			1	1	1		1	2	
Calcutta	C	12	9	18	59	28	28	40	47	35	51	83	92	53	69	75	
	D	11	7	11	40	16	22	29	33	26	41	66	55	36	54	50	
Cochin	C	12	25	22	15	5	6	8	10	19		16	24	15	17	14	
	D	1	3	4	1					1		1	1				
Karachi	C			3				2	1			4			3		
	D			1				1	1							2	
Madras	C	19	9	20	4	4	7	3	2	4	1	3	1	6	3	9	
	D	8	2	3							1				2	1	
Moulmein	C						2										
Negapatam	C	14	9	6													
Rangoon	C	2	1	1						2		1	1	1	1	1	
	D		1											1			
Tuticorin	C	1															
Vizagapatam	C	1							1			8		1		1	
	D											2				1	
India (French):																	
Chandernagor	C	3	3		5	3	2	1	3	2		6	6	3	3	6	
	D	1	1		3	1						1					
Karikal	C	1			3	1	2		2	2		16	1			1	
	D	1			2		2		2	2		16					
Pondicherry Province	C	38	11	19	34	16	8	13	8	1	1	10	7	7		4	
	D	36	11	17	32	16	8	13	8	1	1	10	7	7		4	
India (Portuguese)	C				4	1	4			2	3	6	3				
	D									2							
Indo-China (see also table below):																	
Pnompenh	C	2		1	2				1					1			
	D			1					1								
aigon and Cholon	C		2	2		3	1		2		2	2		1		1	
	D		2	2		2			2			1		3	1	2	
Iraq:																	
Baghdad	C	2										3	6				
Mosul Liwa	C	69	6	16	1		2		1		5						
	D	27		2							1						
Ivory Coast (see table below):																	
Japan:																	
Kobe	C											1	1				
Taiwan	C								1								
Mexico (see also table below).																	
Jalisco (State)—Guadalajara	D	3	3	3			1									1	
Juarez	D	1	1														
Mexico City and surrounding territory	C	13	9	6	10					7	5		11	13			
	D	3	2	6	6				1	1	3	2	2	5			
Vera Cruz	C		1							1		1	1		1	1	
Morocco (see table below).																	—
Nicaragua: Porto Cabezas	C				2												
Nigeria: Lagos	C															2	
Panama Canal Zone	C							2									
Poland	C		8	3	25						1						

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan 10, 1931	Week ended—											
						January, 1931			February, 1931				March, 1931				Apr. 4, 1931
						17	24	31	7	14	21	28	7	14	21	28	
Portugal: Lisbon	C	16	20	37	72	27	31	15	30		12	19	9	16	15	17	
Siam	C	1			1	1	1	1	1	1	1						
Somaliland, British. Boales	C	1	1	1													
	D	1			1												
Spain	C		51	67	68			10	8	10	4	10	46	45	15	21	
Straits Settlements	C	5	10	17	6	3	1	2	1			2				2	
	D	1	2	7	3			1				1				1	
Sudan (Anglo-Egyptian)	C	82	5	50	64	1	7		3	1	1	44	51	3	1	4	
	D	7	1	5	6		7					6	4		1	1	
Sudan (French) (see table below).																	
Switzerland: Berne Canton	C	1															
Syria (see table below).																	
Tunisia: Tunis	C	2			17	6	1	1								4	
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P	P	P				P								
Orange Free State	C		2	P					P			P					
Transvaal	C	P	P	P	P	P	P	P	P	P	P	P					
Upper Volta	C			6	4						8	10					
	D				2												
On vessel:																	
S. S. Clan Mactoggart at Suez	C									2							
S. S. Muncaster Castle at Manila from Hong Kong	C				1												
S. S. Matheran at Suez from Calcutta	C						1										
S. S. Clan Buchanan at Suez	C											2					

Place		August, 1930	September, 1930	October, 1930	November, 1930			December, 1930			January, 1931			February, 1931	
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20
Indo-China (see also table above)	C	93	192	258		86		38	9	14		48	46		46
Ivory Coast	C			4		2		9							
Sudan (French)	C	39	P	17				43		96					
	D	3		2				16		4					
Syria, Beirut	C	1										1			

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
British East Africa (see also table above)							
Kenya	C	156		424		653	
Chosen	C	65	35	3	22		
	D	21	15	5	6		
France	C	1					
Greece	C	1	6				4
Mexico (see also table above)	D	659	718	822	893		1
Morocco	C	3	8	4	4	20	25
Turkey	C	51	21	19	74		
	D	13	4	2	1		

TYPHUS FEVER

Place		Sept. 21-Oct. 18, 1930	Oct. 19-Nov. 15, 1930	Nov. 16-Dec. 13, 1930	Dec. 14, 1930-Jan. 10, 1931	Week ended—												
						January, 1931			February, 1931				March, 1931				April, 1931	
						17	24	31	7	14	21	28	7	14	21	28	4	11
Algeria:																		
Algiers	C		1	2						1	1					3		
Constantine Department	C	2	1	2	6		6	6	19			4			1			
Oran	C	3		5			1	2					1					
Bulgaria	C	6	3	11	3	9	2	1	1		2		3					
	D				1													
Chile: Valparaiso	D														1			
China:																		
Canton	C						2											
Manchuria—Harbin (see also table below)	C	1		1			3											
Shanghai	C						2											
Tientsin	C			1														

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931: 17	24	31	February, 1931: 7	14	21	28	March, 1931: 7	14	21	28	April, 1931: 4	11
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C	1	2	2														
	D		2															
Beheira Province	C				1													
	D				1													
Cairo	C			1	1				1									
Port Said	C	1	2				1											
Eritrea: Asmara	C													1				
Great Britain: Scotland	C								1									
Glasgow	C							2										
	D							1										
Guatemala.[1]																		
Iraq: Baghdad	C									2	1	1	1	1				
	D									1								
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico (see also table below):																		
Durango	D	2						1										
Mexico City, including municipalities in Federal District	C	8	11	14	12	13	12	6	8	13	13	9		46				
	D	2	4	7	10	8	9	9	8	4	7	5		20				
San Luis Potosi	D			2						2	2		1	1	1	2	1	
Morocco	C		3	1	8		5	6	2	7	8	5	8	2	2	3		
	D	1					2				1							
Palestine	C	3	3	7	4	1	1			3				2	1	1		1
Paraguay: Asuncion	D						2	2										
Poland	C	22	37	42	63	19	21	16	50	49	41	43	56	62	58	85		
	D	2		7	3	2	1	4	1	3	3	4	9	4		7		
Portugal: Oporto	C	2	4	6			1											
Rumania	C	14	41	34	113	54	43	51	45	49	53	12	38					
	D		2	3	5	1	7	6	2	5	11	3	5					
Spain	C	2	4	1														
	D	2		1														

Tunisia:																		
Sbeitla, vicinity of	C																20	
	D																7	
Sfax	C															2		
Tunis	C	12		28			7	4	5			6	12	5	2	7		
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P						
Municipality of East London	C	1	1	1	3		1	1	1									
Natal	C	2	P		P	P	P	P	P	P	P							
Orange Free State	C		P		P	P	P	P	P	P		P						
Transvaal	C	P	P	P	P	P	P	P	P	P	P	P						
Yugoslavia (see table below).																		

Place		Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931
China: Harbin (see also table above)	C	5		3			
Chosen: Seoul	C	2	1	7	1	1	1
Czechoslovakia	C	1			16	16	60
Greece: Athens	C	6	4	4	4	10	10
Latvia	C	1	2				
Lithuania	C	7	24	1	5	6	26
	D	1	2		1	3	3
Mexico (see also table above)	D	26	47	47			
Turkey	C	11		28	3	2	
Yugoslavia	C	2		2	2		20
	D	1		1			2

YELLOW FEVER

	Cases	Deaths
Brazil:		
Bahia State—Mar. 14, 1931	1	
Ceara State—Mar. 14, 1931	2	
Barbalha, Feb. 7, 1931	1	1
Minas Geraes State—		
Mar. 20, 1931	2	
Apr. 5–11, 1931	1	
Rio de Janeiro State—		
Mar. 7, 1931	1	1
Mar. 21, 1931	1	1
Brazil—Continued.		
Rio de Janeiro State—Continued.		
Cambucy—		
Jan. 1–25, 1931	3	3
Feb. 1–7, 1931	1	1
Friburgo (imported), Jan. 25–30, 1931	1	
Padua—		
Jan. 18–24, 1931	1	1
Feb. 1–7, 1931	1	1
Gold Coast:		
July 10, 1930	1	
Albosso, Aug. 4, 1930		1

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reports an unusual outbreak of typhus fever in a small village in Guatemala.

X

PUBLIC HEALTH REPORTS

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FUMIGANTS [1]

By C. L. WILLIAMS, *Surgeon, United States Public Health Service*

Hydrocyanic acid is one of the most rapidly fatal poisons known to man. Because of this fact its use as a fumigant is attended by grave hazards to human life. These hazards may be guarded against, but their elimination requires the most meticulous care as well as a wide and thorough knowledge of behavior of the gas. Handled by experts it is reasonably safe, but in the hands of the ignorant, reckless, or careless, it is a frequent cause of fatal accidents, as may be verified in the files of our daily newspapers.

Hydrocyanic acid gas is our nearest approach to the ideal fumigant. Confined in inclosed spaces, quite small amounts destroy all animal life therein; but when liberated in the open air its dissipation is so rapid that it requires very large quantities to produce fatal results in human beings. It is this property of rapid dissipation in the open that permits its use as a fumigant. If it were not for this, fumigators could hardly handle the gas, and upon opening a fumigated building passers-by would be killed, whereas, as a matter of fact, it is practically impossible to force gas out of a building in sufficient volume to become dangerous to persons in the open air.

The gas is very penetrating; it will actually penetrate a brick wall if given sufficient time, although within the time allowed for fumigation this rarely occurs. Of course penetration through cracks in a wall is another matter. It will penetrate into the center of a sack of flour in about two hours; and if the concentration is maintained sufficiently high, enough gas will penetrate a sack of flour in six hours to kill weevils. Highly porous material is very rapidly penetrated by this gas—a fact of considerable importance to fumigators, since the gas penetrates their clothing almost at once.

Penetration being merely one feature of diffusion, it is not surprising to find that the gas also rapidly passes out of materials it has penetrated. A comparatively short stay in the open air will remove most of the gas from fumigated articles. An hour's airing, for example, renders a mattress safe to sleep on, unless an excessively

[1] Read before the police school in New York City, January 9, 1931.

heavy concentration of gas has been used. Water, however, absorbs hydrocyanic acid and holds it, particularly in cold weather, so that after fumigation, moist articles require longer airing than dry ones. Ordinarily, gas absorbed by collections of water is given off so slowly that it is not dangerous; but occasionally a relatively large amount is taken up on a cold day, and when a warm day follows, the gas is then given off more rapidly. One or two accidents on ships have been attributed to gas absorbed and later released from bilge water under such circumstances. On one occasion the ship passed into the warm waters of the Gulf Stream.

From what has been said of dissipation of the gas in the open air it will be realized that it is only when gas is liberated in closed spaces, such as closed rooms or ships' holds, that it becomes dangerous. Foods absorb the gas, but not in dangerous quantities from the concentrations generally used in building fumigations. It is well, however, to air fumigated foods for two or three hours before eating them. Foodstuffs fumigated in fumigation chambers with high concentrations of this gas (10 to 20 ounces HCN per 1,000 cubic feet) should be aired at least 24 hours.

Hydrocyanic acid gas is not injurious to the vast majority of the articles of commerce. In the concentrations used for ship fumigations to kill rats it is not injurious to any known material, including such delicately flavored commodities as tea and tobacco. This is a very important consideration and one of the dominating ones in the establishment of this gas as a fumigant. In heavier concentrations (10 ounces per 1,000 cubic feet) it is injurious to delicate vegetables, such as lettuce and probably to bananas, interfering with the ripening processes. It probably would kill living foods, such as oysters, although the necessity of fumigating oysters has never arisen. Fumigated eggs usually will not hatch. (Probably few people would suspect that the gas penetrates through the shells of eggs.)

Because only small amounts are required, hydrocyanic acid gas is a cheap fumigant, probably the cheapest effective fumigant. For the destruction of rats, only two ounces of HCN per 1,000 cubic feet of space is required. At $1 a pound, this amount costs 12½ cents.

METHODS OF USE

Hydrocyanic acid is used as a fumigant in one of three ways:

(1) It is generated on the premises.

(2) It is supplied ready prepared as a liquid in steel cylinders, from which it is forced by air pressure and introduced as a fine spray, which at once evaporates.

(3) It is supplied as a solid which is spread on the floor. This solid form may be liquid HCN absorbed in an inert material, from

which it evaporates, or it may be calcium cyanide powder, which absorbs moisture from the air and generates HCN.

The following is a list of the cyanide fumigants generally employed arranged according to the method of preparation:

(A) GENERATION METHODS

(1) *Hydrocyanic acid gas* generated by adding sodium cyanide to 50 per cent sulphuric acid.

(2) *Hydrocyanic acid, cyanogen chloride mixture.*—The gas is generated by adding NaCN and sodium chlorate to 50 per cent hydrochloric acid.

(3) *Safti-fume.*—This is the same as the hydrocyanic acid-cyanogen chloride mixture, except that the NaCN and $NaClO_3$ are ready mixed with sand and other more or less inert ingredients in the form of briquettes, which are dropped into HCl.

(B) HYDROCYANIC GAS IN SOLID FORM PERMITTED TO EVAPORATE

(4) *Zyklon.*—Liquid HCN absorbed in Fuller's earth. Packed in heavy cans.

(5) *HCN discoids.*—Liquid HCN absorbed in unsized paper disks. Packed in heavy cans.

(6) *Cyanogas.*—Calcium cyanide, a fine powder, packed in heavy cans.

(C) HYDROCYANIC ACID IN LIQUID FORM; INTRODUCED AS A SPRAY

(7) *Liquid hydrocyanic acid* in heavy steel cylinders. Forced through a hose and out a spray nozzle by air pressure.

Of these various preparations the most effective is liquid hydrocyanic acid. It is the most dangerous to use, both to the fumigators and to the innocent bystanders. The Interstate Commerce Commission requires that it be shipped only in heavy steel cylinders, the size usually employed holds 75 pounds. Since the liquid is extremely volatile, should a cylinder be broken in a traffic accident the results might be disastrous; for despite its rapid diffusion in the open air, the large amount immediately liberated would probably overcome those in the immediate vicinity at once. However, these cylinders are very strong and no accident due to their being broken by outside force has been reported. For use on ships the liquid is transferred to smaller and lighter (tested to 600 pounds pressure) steel cylinders holding 18 and 30 pounds. These are transported on the fumigating boat. In fumigating buildings the heavy cylinders are invariably used.

Set in the tops of the cylinders are two valves. From the outlet valve a steel tube leads to the bottom, the other opens directly into the cylinder, and through it air is pumped, just before use, until a

pressure of 75 to 100 pounds is reached. To the outlet valve is attached rubber pressure tubing ending in a spray nozzle; this is led into the space to be fumigated, the valve is opened, and the liquid forced out by the air pressure is sprayed into the air. The amount used is measured by placing the cylinder on a platform scale and noting the progressive loss of weight. In large buildings it is necessary to lay the hose to various parts before starting. Flour mills and similar large structures frequently fumigated are often equipped with a built-in system of lead or copper piping with an outside connection for the cylinders.

The dangers particularly attendant on the use of liquid hydrocyanic acid are from two sources: One is the fact that the gas reaches full concentration immediately, so that anyone caught in the building does not have time to get out. The other comes from leaks in the tubing, particularly at the joints. It is the latter that is the main danger to fumigators. As regards the former, of course, no one should be permitted to be in a building or ship about to be fumigated, and it is the fumigators' particular business to see that all are out; but despite the most careful guarding, unauthorized persons sometimes get caught. If liquid hydrocyanic acid is the fumigant they will never be caught again. This danger is a very real one, even to the best-trained fumigators. Recently on a ship a hose line, inadvertently left under pressure, was being uncoupled when a spray of liquid suddenly flared out from the loosened coupling. It missed the fumigator's face by a few inches and his trained instinct told him to keep breathing out till he was 20 feet away, so that he escaped; but for a moment it looked as though there would be a vacancy in that fumigating crew. A fumigator of 16 years' experience was killed in New Orleans by pulling apart a clogged hose line. The liquid hydrocyanic acid shot back into his face.

There is one other danger connected with liquid hydrocyanic acid and that is spontaneous explosion in the cylinders. This is not a serious danger at present, but its possibility should be kept in mind in case of cylinders that have been in storage six months or longer. When hydrocyanic acid is permitted to acquire an alkaline reaction, it disintegrates, the chemical change becoming progressively faster and faster. Nitrogen and ammonia gases are formed and these accumulating in the cylinder increase the pressure. At a certain point the reaction becomes violently explosive, sufficiently so more or less to wreck everything in the immediate vicinity. Commercially it is now preserved by the addition of acetic acid. No explosive accidents have occurred during the past several years, but the companies supplying hydrocyanic acid keep track of the cylinders and call them in three months after shipping. Tests have shown that acetic acid in proper amounts prevents explosive deterioration for a

year or more, so that the safety margin is large. Explosion in fires will be referred to later.

Somewhat less effective in equivalent amounts, but far more easily and safely handled, are Zyklon and HCN discoids. These products are essentially the same. Zyklon has the advantage that the cans may be opened with a hammer, while discoid cans must be opened with a special opener making a clean cut close to the rim. Discoids have the advantage that each disk holds approximately one-half ounce of hydrocyanic acid, thus permitting reasonably accurate dosage of small compartments. Both come packed in 40-ounce cans of much heavier gage than the ordinary tin can. To use them, the can is opened and the contents are shaken out and spread on the floor. The cans may be opened out of doors and carried in, but usually they are opened inside, in which case the operators must wear gas masks. The gas begins to come off immediately, and within one hour most of it has evaporated. If fumigation time is two hours or more and ventilation is continued for an hour or more after fumigation, the spent discoids or Zyklon residue will be found quite dry and harmless and may safely be left where they are. An exception must be noted here: One would suppose that even a very ignorant fumigator would realize the necessity of spreading out the fumigant to insure rapid evaporation, but it does sometimes occur that careless men will pour these materials out in piles or stacks which may retain some liquid HCN for as long as four or five hours, possibly longer in severely cold weather. An overnight (12 hours or longer) fumigation, however, insures that the residue will be found dry and free from all but traces of HCN.

The simplicity of use of HCN discoids and Zyklon is quite apparent. One merely takes his fumigant, in cans of convenient size, into the building, opens them, spreads the contents, and goes out, closing the door behind him. After fumigation, the residue is swept up and, with the empty cans, thrown into the trash. What could be simpler? Yet, it has its attendant danger and one that is equally inherent in all the generation methods of fumigation. That is, the fumigator must take the fumigant into the space fumigated and remain long enough to open the cans and spread it around. In the case of generated gases he must remain long enough to drop the cyanide into the various acid barrels or crocks. This means that he must be exposed to the gas for a certain length of time. In small buildings or on ships this is a trifling consideration, the time of exposure being quite short; but in large buildings, in which spreading the fumigant may take an hour or more, it is often a serious problem, sometimes requiring the arrangement of relays of fumigators. The danger arises through the absorption of HCN through the skin.

A good gas mask protects completely against cyanide in the inspired air, at least up to a concentration materially above the concentrations usually used in fumigation of buildings or ships; but to protect the surface of the entire body, a complete rubber suit would be required. This is impractical for several reasons, not the least of which is that it would soon be most uncomfortably hot on the inside. Yet it is not so very unlikely that skin absorption of cyanide may force some such protection in certain kinds of fumigation procedure.

It was in order to stress this point that I mentioned earlier that HCN rapidly penetrated clothing. In fact the penetration through clothing, promoted as it is by the motion of the fumigators and air currents set up by the heat of the body, is practically immediate. A person may go into a relatively concentrated gas, say 2 or 3 ounces per 1,000 cubic feet, without noting any skin effect; but if he enters a concentration of 6 to 10 ounces per 1,000 cubic feet, he will at once experience a sensation of warmth over the entire body which becomes more and more pronounced. After five minutes spent in such an atmosphere the entire skin surface becomes noticeably reddened, and sensitive persons may experience an actual burning sensation. If this warning is disregarded, a feeling of weakness appears, followed by nausea and vomiting and often by headache. A still more advanced sign of poisoning is difficulty in breathing, the subject feeling as though giant hands were holding the chest and preventing its expansion. This is the last warning, being the forerunner of loss of consciousness and paralysis of the respiratory nerve center. Experienced fumigators seldom reach this stage, but it is not unusual to see them emerge from a large building decidedly wobbly in the knees and distressingly sick. While there is not available at present any exact data regarding absorption through the skin, it is, I believe, safe to state that, protected with a good gas mask, one may remain in air containing 2 ounces HCN per 1,000 cubic feet for one-half hour without experiencing signs of poisoning. In a concentration of 4 ounces per 1,000 cubic feet, this should be reduced to 15 minutes, and in 8 ounces per 1,000 cubic feet to 5 minutes. Of course the distribution of 8 ounces of Zyklon or discoids per 1,000 cubic feet, in a building does not mean that the fumigators are exposed to such a concentration, since the full amount will not have entered the air short of one hour. Since the fumigators are nearly always going away from the gas it is unlikely that they are actually exposed for the greater part of the time to more than 1 or 2 ounces per 1,000 cubic feet.

Zyklon and HCN discoids do not present the transportation dangers of liquid HCN. Being in a solid form they do not flow; and with the evaporation rate much slower, quite a large amount

(relatively, not in terms of tons, of course, but of pounds) may be spilled in the open without immediate disaster. Leaking cans are not a menace in the open, since the gas is given off so slowly through ordinary leaks that one would have to hold such a can close to his face to become poisoned. Because of this reduced danger from breakage, the Interstate Commerce Commission permits shipment in heavy-gage cans. Leaking cans in storage may be a source of danger, since the gas is then liberated in an inclosed space. For this reason it should be stored only in well-ventilated rooms.

Cyanogas, which is the trade name for calcium cyanide, differs from Zyklon and HCN discoids in one important respect: This is that the residue is poisonous. Calcium cyanide is a very fine powder, usually packed in cans. When the cans are opened and this powder is spread out, it absorbs moisture from the air. This causes a chemical change to calcium hydroxide and HCN, the latter being given off into the air. But, and here is the difficulty, some of the HCN is absorbed by the calcium hydroxide and changed to calcium cyanide and water. Under any circumstances there is always some calcium cyanide left in the residue which, therefore, must be gathered up and safely disposed of. One method of getting around this is to take advantage of the fine powder form of the material and to blow it into the air, from which it settles as a fine dust. There appears to be no great objection to this, in the absence of foods, from a safety standpoint, it being inconceivable that anyone would sweep up this powder and eat it; but where foods are fumigated they become inseparably mixed with the fumigant. If calcium cyanide is left for several days' airing, the cyanide content finally becomes so low as to be negligible.

The so-called barrel methods, or generation methods, of fumigation, which require the placement of barrels or other containers, in which sodium cyanide is mixed with an acid, all involve the same essential procedure. There are two main variations: In one only HCN is generated; in the other, a mixture of HCN and cyanogen chloride is produced. The procedure in either case is to mix the acid with an equal amount of water in a barrel or crock (depending on the size of the space to be fumigated), put it in place, drop into it sodium cyanide in a paper or cloth bag, and leave. It sounds simple; but if this has to be done on each of five floors of 40,000 square feet each, and each one cut up into various sized compartments, the difficulties will be multiplied. Yet, I once saw this feat performed by five men, none of whom wore a gas mask or even had a mask among them. They decided they would never get out alive if they tried to drop the cyanide by hand, but got around the difficulty after considerable tedious labor by suspending the cyanide in bags over each barrel and leading the suspending cords over pulleys all the way to the front door on the

street level. They had over 100 cords tied at the door, representing more than 6 miles of cord. When all was ready they cut all the cords and shut the door. With gas masks the dropping is usually done by hand, in which case the fumigators became exposed to absorption through the skin, as occurs with Zyklon and similar materials.

The generation method involves a large amount of work. The ingredients must be mixed in the proper proportions and amounts, and this involves measuring the acid and water and weighing the cyanide, although the latter procedure is much simplified by the use of cyan-eggs, that is, sodium cyanide in the shape of balls, each weighing 1 ounce. The apparatus is bulky and cumbersome and must not only be put in place but must also be removed. The spent acid cyanide mixtures must be safely disposed of.

Aside from cyanide dangers, the acids used are injurious. Sulphuric acid is a highly corrosive poison, either internally or externally. It is ruinous equally to the fumigators' clothing and their skins; several serious accidents have been caused by breaking of jugs of acid. It is also highly injurious to floors and fittings. Its corrosive action on barrels often causes them to spring leaks, and if too much material is put in a barrel it may boil over. Hydrochloric acid used in the generation of cyanogen chloride mixture is far less injurious than sulphuric acid, but it is by no means harmless.

The generation method, like all other cyanide methods, has its own peculiar danger. Here it is the spent acid cyanide mixture, which is not truly spent at all. When the barrels are removed, the shaking up of the mixture often causes the liberation of considerable volumes of HCN gas. It is hardly necessary to discuss this further; the danger is obvious. It might be said that experienced fumigators are aware of this danger, and on smelling the gas get out at once or put on masks. I have seen some very rapid ascents up the ladders leading out of ships' holds in the days before gas masks became generally used. Several fatalities from this cause have occurred, though none I believe, of recent date.

Cyanogen chloride mixtures are generated by putting diluted hydrochloric acid in the barrels and dropping into it a mixture of sodium cyanide and sodium chlorate. The resultant gas is a mixture of about one-third HCN and two-thirds CNCl. Recently a modification of this method, commercially known as "Safti-fume," has been put on the market. It consists of the cyanide and chlorate mixed with sand and some other materials put into the form of solid, but porous, briquettes, which are dropped into the acid. The cyanogen chloride is a very highly irritant gas, particularly to the eyes, nose, throat, and lungs. In even moderate concentrations it is practically intolerable, causing pain and weeping in the eyes, discomfort in the nose and

throat, and pain and coughing in the chest. It is not as effective a fumigant as HCN, but is largely used on account of its warning properties.

WARNING GASES

This brings up the subject of warning gases. These are substances added to the fumigant for the purpose of giving warning of the presence of the gas. Hydrocyanic acid has a distinctive odor and may be detected by experienced fumigators in quite a low concentration. To the uninitiated, however, its odor does not indicate danger, nor in lethal concentration does it cause discomfort. Persons have been killed without ever knowing that they were in danger, as occurred recently when three members of a family were found dead sitting at the breakfast table while the fourth, also dead, was reading a newspaper when overcome.

Because of such accidents, numerous attempts have been made to incorporate in the fumigant gas, other gases which, due to highly irritant properties, give a distinct warning of their presence, even when in quite small amounts. The aim has been to render a fumigated space literally intolerable until airing has removed all but traces of the fumigant. This objective has never been completely realized. Nearly always the warning substance used has been a tear gas, although evil smelling gases and some that primarily cause coughing or choking sensation have been tried with some success. Usually the warning gas is present in small amounts; chloropicrin, the gas most commonly added to HCN, seldom constitutes more than 5 per cent of the mixture. In some cases, however, advantage is taken of the fact that most warning gases are themselves poisonous and may be used as fumigants. Chloropicrin, for example, is advocated by the manufacturers as a fumigant. The use of cyanogen chloride is another attempt in this direction.

There are two distinct dangers connected with the use of warning gases. One is, that when present in sufficient quantity to be actually intolerable, they constitute a menace to the fumigators, who may be rendered helpless by the effects of the warning gas. Tear gases, for example, may get inside a gas mask in sufficient amount to blind the fumigator. The other is that the warning gas may disappear before the HCN, so that fumigators misled by the absence of warning gas may declare a place safe when it is not. Two cases of this nature have occurred on ships in my own experience. This failure of after-warning appears to be due to the warning gases being much less penetrating than the HCN. The latter is absorbed by porous materials, while the warning gas, not being absorbed, is blown away by air currents. Upon its disappearance, the room is declared safe and is closed; but the absorbed HCN, slowly liberated, passes into the now confined air where it produces an unsuspected dangerous concentration.

Another way in which warning gases sometimes fail is when penetration occurs through a porous partition. It is my belief that this occurred in a recent fumigation accident. The gas apparently penetrated through a brick wall, probably mainly through numbers of small cracks. The HCN portion of the gas, being much more penetrative than the CNCl, came through first and caused poisoning of several persons (fortunately not fatal) before the CNCl penetrated in sufficient quantity to give a positive warning.

Thoroughly competent fumigators do not rely on warning gases alone. They do, however, use them as a help, both as a warning to others and to assist in detecting the gas themselves.

There is one fumigant, still used often enough to be considered, that is quite intolerable in amounts far below the immediate lethal concentration for man, and that is sulphur dioxide, produced by burning sulphur. This gas is highly irritant to the lungs, however, and while human deaths by being directly fumigated with it are rare, severe bronchitis and fatal pneumonia following exposure to it have been by no means uncommon. Formaldehyde is practically intolerable in relatively small amounts, but it is rarely used as a fumigant to-day because it has little effect on animal life.

HCN POISONING

Hydrocyanic acid and other gaseous cyanogen compounds, including cyanogen chloride, are distinct from all other fumigants in general use, in the rapidity with which poisoning is induced. A man walking into a concentration of 8 ounces or more per 1,000 cubic feet and breathing normally therein will become unconscious in 30 seconds and will be dead beyond hope of recovery in from 3 to 5 minutes. If he goes into the much lower concentration of 2 ounces per 1,000 cubic feet, used to kill rats, and breathes normally, he will lose consciousness within a minute and will be dead within 10 minutes. If a person rendered unconscious is brought at once into the open air before he stops breathing, he will usually recover unaided and will suffer, as a rule, no serious aftereffects, of which the principal ones are headache of very variable duration, nausea and vomiting, and rapid pulse rate. If he has stopped breathing, artificial respiration must be instituted. If the heart is still beating, his chances of recovery are good, but the aftereffects are more severe, as a rule, the most important being weakness of the heart, which may persist for several months. There are cases on record of recovery from cyanide poisoning after artificial respiration for as long as eight hours. As long as the heart continues to beat, there is hope. When the heart beat has definitely ceased, all chance of recovery has gone with it.

It is the rapidity of poisoning, particularly the rapidity with which the victim is rendered helpless through loss of consciousness, that has

given rise to the fear and respect exhibited toward the cyanides in any form. Particularly is this true of the gas. The gas taken into the lungs is absorbed over a large surface rapidly and directly into the blood stream, which takes it at once all through the body. The amount of cyanogen that will poison is so minute that its effect is felt at once. In the case of all other fumigants at present in use, much larger amounts must be taken into the body to cause immediate poisoning. This requires time. But there is another factor: Cyanogen acts first on the nerve cells, particularly the more highly developed and specialized cells. Thus the cells controlling consciousness are the first affected, their failure rendering the victim utterly helpless to effect his own rescue. Next, the respiratory center is paralyzed and breathing ceases. Apparently the lower nerve centers are at first stimulated, or at least rendered more sensitive, for generalized convulsions are a constant accompaniment of cyanide poisoning, though they cease, as a rule, before the heart stops.

Persons breathing small amounts of cyanides over relatively long periods, say one-half hour to several hours, are likely to be affected in various ways. They may lose consciousness but continue breathing, and may finally die in convulsions or recover after several hours of coma. Then, again, they may retain consciousness but fall dead of heart failure on making some extra exertion. Usually a prominent symptom in cases of slow poisoning is extreme weakness and headache. Convalescence in such cases is likely to be slow, sometimes taking several months to a year or more. This type of poisoning may occur when persons have entered closed places still holding a small amount of gas.

While the possibilities have been stated, the usual occurrence is death or recovery within a relatively short time. In the great majority of cases the issue is definite within a half hour. Once natural breathing is reestablished, recovery may be expected, and usually it is rapid, the patient often being able to walk away from the scene and usually feeling quite well within two or three days. Nearly always the determining factors are the amount of gas and the length of time the patient has been exposed to it.

TREATMENT OF HCN POISONING

There is just one treatment of cyanide poisoning, and that is fresh air and plenty of it. Fresh air must enter and leave the lungs as in normal respiration. If the subject is breathing normally, carrying him into the open is enough. If his breathing has stopped, is materially slowed, is shallow, or is irregular, artificial respiration is required. When normal breathing reappears, artificial respiration may be discontinued, but may have to be resorted to again if breathing again becomes irregular. There is no known antidote for cyanogen, and so

the only method of recovery is to throw it off. Fortunately it is given off by the lungs quite rapidly, though not as rapidly as it is absorbed.

Usually the ordinary methods of artificial respiration are sufficient. If a mechanical respirator is used, it is essential that it be one that does not cause rebreathing of the expired air. Since the expired air is laden with the cyanogen being thrown off from the lungs, it is obvious that if any of this is rebreathed the patient is repoisoned by his own breath. Pulmotors and other mechanical respirators are certainly labor-saving devices; but it is doubtful whether they are any more effective than artificial respiration by hand in cases of cyanide poisoning.

RESCUE AND GAS CONCENTRATION

The rescue of persons overcome by cyanide fumigation is likely to be a rather futile procedure, for the reason that by the time the emergency squad reaches the scene there will only be dead bodies to rescue (and this is stated without reflection on the speed of the emergency squad). By rescue, of course, is meant the removal of persons overcome from the presence of the gas. As a rule, rescue must be at least as prompt as rescue from drowning, the situations being quite analagous. Immersion in water for 10 minutes or more is generally fatal, and immersion in cyanide gases for the same length of time is likely to be equally so. In the latter case, however, there are exceptions, depending on the concentration of the gas. The lower the gas concentration, the longer the exposure that can be withstood. Consequently it is never proper to give up a person who has been in gas, even for considerable periods, until it has been definitely determined (by use of a stethoscope) that the heart has ceased beating.

The subject of rescue is inseparably bound up with gas concentration, and so a slight digression may be allowed for its consideration. The usual practice in preparing a building for fumigation is to close all openings to the outside, including sealing, with strips of gummed or greased paper, the cracks around doors and windows. The purpose of course, is to keep the gas within the building. Despite the most painstaking care, however, it is practically impossible to seal a building 100 per cent. There is always considerable leakage. If there is any considerable wind blowing, the leakage will be greatly increased. In addition to leakage, a very considerable amount of HCN gas is absorbed by the walls, floors, fittings, and stored materials, still further reducing the concentration in the air. As a result of this leakage and absorption it is very rare to find at any time an actual concentration of gas in the air as high as that calculated on the basis of the amount of fumigant introduced. If liquid HCN has been used, the maximum concentration appears at once. If the solid fumigants are used, or any of the generation methods, the highest concentration appears in from one-half to one hour after starting.

The loss of gas is usually fairly rapid, particularly during the first two or three hours, becoming progressively less and less. At the end of four hours it is probable that more than half of the gas introduced has been lost; at the end of six hours two-thirds or more is gone. At the end of 12 hours there is rarely enough gas left to be immediately dangerous. At the end of 24 hours there is seldom more than the odor. However, one can not depend on this general rule entirely. The gas distribution is likely to vary, some compartments or rooms retaining more than others. If a wind is blowing, there will always be a higher concentration on the side away from the wind. The greater the amount of gas originally introduced, the longer a lethal concentration will persist, but not proportionately longer. Even with quite large initial doses one seldom finds any considerable amount left after 12 hours.

The practical bearing of concentration on rescue relates to the relative time at which victims are overcome. If they have been caught in the building at the beginning of fumigation, the rescuers must work in a high and increasing gas concentration, but if they have entered it several hours later, they will be in a much lower gas concentration which not only makes it much easier for the rescuers to reach and remove them, but also increases their chance of recovery.

Another condition wherein concentration is important is the case of persons overcome in buildings adjoining the one fumigated. There are two classes of such accidents. In one, the gas leaks into the adjoining building through some connecting avenue, such as breaks in a party wall, pipe tunnels for plumbing, or similar openings. The other is where gas escaping from a building is blown into an adjoining one; this is most likely to occur when the fumigated building is opened after a relatively short exposure. In either instance, the concentration is necessarily much lower in the adjoining building than in the fumigated building. Usually, it is not high enough to necessitate the use of gas masks by the rescuers, who, as a rule, can count on five minutes or more that they will be able to withstand the gas. Poisoning in these cases is slow. It is in this type of accident that persons are overcome without being aware of their danger. It is in preventing such accidents that warning gases have their most useful field in the fumigation of buildings.

When gas masks are available, they should always be worn in rescue work; but if not available, persons may yet often be rescued without serious danger to the rescuers if the rescuers keep their heads. Time is a most important factor to the victim, and so any material wait for gas masks is not justified in cases where the victims can be quickly reached. The immediate danger is from inspired air; therefore the precaution to be taken is not to breathe. Almost anyone can hold his breath for as long as one minute. In this length of time

it is quite possible to reach a man as far as 100 feet from the entrance and drag him out. In the vast majority of cases the rescuer can count on taking at least one full breath without being overcome. This assurance will permit him to continue his efforts until forced to breathe, when he should stop and return at once to the open air. This is in the interest of both himself and the victim; for if he too is overcome there are then two to be rescued instead of one. After taking four or five breaths in the open it will be possible for the rescuer to return; but on this occasion the breath can not be held as long as at first, a condition that should be kept in mind. When the taking of a breath can no longer be postponed, some 10 seconds additional time before taking an inspiration may be gained by consciously prolonging expiration. That is, when you must take a breath, breathe out first as slowly as you can and as much as you can. This extra 10 seconds is sufficient time to get to a door from a location as much as 100 feet away. When two or more rescuers are at work, one may drag the victim part way out, the other then coming in and bringing him the rest of the way.

Rescuers should, whenever possible, work in pairs, even when equipped with gas masks. If not equipped with gas masks, one man should remain in the open watching the other till he comes out. The reason for this is obvious. If the rescuer falls, the second man should go in and *bring him out first;* he can surely be saved, while the chances for the other victim are already problematical.

If there is reason to believe that the gas concentration is low, say, for example, the building has been under fumigation for six hours or more, or if persons in an adjoining building have been overcome, the rescuers may be more venturesome; but in any case they should remember that, the victim having been overcome, they too will be overcome if they stay too long. The best guide in such cases is the appearance of a sensation of weakness, particularly weakness of the legs. If difficulty in breathing in the shape of a sensation of pressure preventing expansion of the chest appears, the warning is imperative; get out at once. In any case it is usually unwise to remain in even low concentrations without a gas mask for longer than five minutes.

When a tear gas has been used as a warning, rescue work without gas masks is greatly complicated. When the warning gas is chloropicrin, it is often possible to remain in the gas for a minute or more without being actually blinded, although pain in the eyes may become quite severe. Chloropicrin is seldom more than 5 per cent of the gas present, sufficient to warn, but in concentrations of less than 4 ounces HCN per 1,000 cubic feet, not enough to blind one. If cyanogen chloride mixture is the fumigant, the rescuer without a mask is likely to find himself in the same fix as the victim. In this mixture, the cyanogen chloride constitutes 60 to 70 per cent of all the gas

present and is so extremely irritating to the eyes as to blind those entering it unprotected. The blinding effect lasts as long as one is in the gas, but this is quite long enough to prevent one from finding his way out. The irritative effect of cyanogen chloride, however, is so immediate and severe that it is doubtful whether the most courageous rescuer would proceed more than a few feet into it before turning back. A man deprived of his sight in a deadly gas is practically helpless, and so further attempt would be merely foolhardy.

In rescue work there is no point to throwing open the building under fumigation as a preliminary act to the removal of the victims. The time so lost is likely to be fatal to those overcome, whose only chance is immediate removal to fresh air. There is no hope that the building will clear of gas in time to save those within. In fact, opening the building may complicate matters by liberating large volumes of gas into the immediately surrounding air. An exception should be noted in the case of gas getting into adjoining buildings. While here, too, the first object is to remove the victims the next step should usually be prevention of further unwanted gas infiltration by opening the fumigated building.

GAS MASKS

Any gas mask that uses charcoal as a filtering material will protect for a time against cyanide gases. If only charcoal is present in the canister, it can not be relied upon for longer than 10 or 15 minutes. Against the cyanides far greater protection is afforded by a canister containing an alkali such as sodium hydroxide. One type of HCN canister contains caustic pumice (a mixture of pumice and an alkali) and charcoal and protects against all types of cyanide gases for a considerable period, as much as an hour. Against cyanogen chloride the best protection is a mixture of caustic pumice and iron gell (iron hydroxide). The army canister for HCN-CNCl mixture contains these substances. Of course we are speaking of gas concentrations used in fumigation. Very high gas concentrations go through the canisters; that is, some of the gas gets through. This occurs sometimes to fumigators opening cans of Zyklon or discoids, the gas concentration from the freshly opened cans directly under their masks being for the moment quite high. It also occurs in the fumigation of tobacco warehouses, where concentrations as high as 200 ounces per 1,000 cubic feet are sometimes used. The so-called all service canisters will protect against cyanide for a sufficient time to effect rescues, although in the presence of cyanogen chloride they are likely to let through enough of this substance to cause considerable discomfort.

Gas masks used in cyanide gases must fit closely to the face. This is essential in the presence of a substance that is poisonous in such small amounts. Leaks in the face piece or around the edges can not

be permitted. Most gas masks are made in different sizes, commonly three sizes, so that it is usually necessary for each individual to learn which size fits his face. The No. 2 size fits the average face.

The life of the canister is limited. Those designed for the cyanides will generally protect against the amounts used in fumigation for from one to four hours of steady breathing. When the canister is becoming ineffective, breathing through it becomes much more difficult. Experienced fumigators can tell from the smell of the gas when a dangerous amount is coming through; but the best procedure for the inexperienced person is whenever there is any cause to suspect the reliability of the canister to get a new one. After a canister has been used in cyanide, the next time it is used a cyanide smell will be noticed for a few breaths; but this should soon disappear. When one enters the gas a slight odor of cyanide generally comes through. This, too, should cease within two or three minutes. If it persists or gets strong, the mask or the canister is leaking. In the case of cyanogen chloride, determination of leaks is very easy; if sufficient gas to be dangerous comes through, the wearer will be practically blinded by the eye irritation. If he can stand the irritation, then only very small amounts are getting through.

OTHER FUMIGANTS

There are a number of other substances employed in fumigation, none of which at present, however, are used in this country to the extent that cyanides are used. All that have come into use to date are very much less poisonous than the cyanide gases, but they are used in very much larger amounts.

Sulphur dioxide, generally produced by burning sulphur, either on the premises in iron pots set in pans of water, or in special furnaces from which the gases are led through a large pipe into the space under fumigation, is the gas par excellence in the matter of warning of its presence. In concentrations far below the quickly fatal level it causes severe irritation of the throat, producing a sensation of choking as well as persistent coughing. It is not rapidly fatal like HCN and so persons caught in it have ample time to make their way out. Although eye irritation occurs, it is not blinding. It is the only nearly safe fumigant that we know.

Sulphur fumigation has been almost entirely abandoned in this country, because the gas penetrates very slowly and not very deeply so that its results are unreliable, because it is highly injurious to many foodstuffs, most fabrics, and nearly all metals, and because of the fire hazard due to burning it inside of the space fumigated.

Sulphur is mentioned principally because sometimes an emergency call is made from a house the occupant of which has bought a sulphur candle at a drug store and burned it in a room. The amount of sulphur dioxide produced in such a case is usually much too little to be

dangerous. The principal result is that everyone is driven out of the house.

Formaldehyde is an irritant gas, irritating the eyes, nose, and throat. It is not dangerous to human life unless it is in an enormously high concentration and then only after long exposure.

Within the past five years three substances have been developed as fumigants which will probably become quite wide spread in use. These are ethylene dichloride, ethylene oxide, and a mixture of ethylene oxide and carbon dioxide, marketed under the trade name of "Carboxide." The first named, ethylene dichloride, is not greatly used at present; and when used it is generally mixed with carbon tetrachloride to remove the fire hazard. It is for the same purpose that carbon dioxide is mixed with ethylene oxide. Ethylene oxide, however, is also used alone.

These fumigants are much less poisonous than HCN and, hence, must be used in much higher concentration. Their value comes from two properties: They are relatively more poisonous to insects than to warm-blooded animals, including human beings, and they are relatively slow in their action. These properties permit fumigation for the destruction of insects with greatly reduced hazard to human life. They are not nearly so rapid in their action as HCN, permitting more time for those trapped to escape.

These gases are not highly irritating and, hence, small amounts do not give positive warning of their presence. That they are irritants and cause damage to the lungs has been shown by some recent studies of the United States Bureau of Mines. Up to date there has been comparatively little use of them for the fumigation of buildings, and it is doubtful whether they will ever come into general use for such purpose. They must be used in a high concentration, maintained over several hours—conditions that involve a cost several times that of HCN fumigation. However, they may come into use in the fumigation of buildings so placed that the use of HCN involves too great a hazard. At present they are employed in connection with specially constructed fumigation rooms or vaults.

From what we know at present, these gases may be entered for short periods, three to five minutes, without serious risk; but if longer stay is necessary, gas masks should be worn. Gas masks containing charcoal in the canisters will protect against them for a time. I am not aware whether special gas masks for them have been as yet developed.

Ethylene dichloride, alone or mixed with carbon tetrachloride, is a liquid at ordinary temperatures and is marketed in steel drums. Ethylene oxide and Carboxide are both gases at room temperatures. The former may be packed under pressure as a liquid and is shipped in this form, the latter remains as a gas and is supplied in heavy steel

pressure cylinders. The immediate danger in handling these materials is much less than that with HCN. In using Carboxide, for example, the required number of cylinders is placed in the space to be fumigated and a man opens the valves on one after another till all are opened, and then goes out. This has been done in relatively large spaces where as many as a dozen cylinders were used by fumigators unequipped with gas masks, without apparent injury.

These gases require considerable study before any very definite statements can be made concerning them. We are steadily gaining knowledge of their action on human beings through their growing use in medicine as anæsthetics. In ship fumigation for quarantine purposes they are of little value, because to kill rats they must be used in relatively enormous doses.

FIRE HAZARDS

Fire hazards fall into two categories: One is the hazard of starting or increasing a fire; the other is the danger of poisoning to those fighting a fire. The latter danger would appear only when fire breaks out in a building that is being fumigated. In this instance, of course, it would be impossible for firemen to enter a building under fumigation with HCN unless they were protected by gas masks. This is an important consideration, since many fires that may be rapidly extinguished from inside a building are difficult to fight from the outside. If the firemen do not have gas masks, the only thing to do is to break open doors and windows as rapidly as possible so that the gas may escape. It is realized that the fire itself may be greatly augmented by feeding it fresh air. Once a fire really gets under way, the draft produced will very rapidly clear out the gas.

There is no danger of explosion from the amounts of HCN used in building fumigation, except with the very heavy dosages sometimes used in tobacco warehouses. The lowest explosive mixture of HCN is 6 per cent of the vapor in the air, while in fumigation it is rare to have more than 2 per cent. Apparently there is little danger of explosion or combustion of Carboxide, or ethylene dichloride with carbon tetrachloride; but either ethylene oxide or ethylene dichloride alone is very inflammable and may be used in such amounts as will cause explosion or direct extension of the fire by the gas.

Fires have been started with the solid forms of HCN (Zyklon, discoids) by their being scattered close to stoves in which the fires had not been extinguished. In the generation methods of producing HCN a considerable amount of heat is evoked by the reaction. With straight HCN (NaCN and sulphuric acid) the heat produced is not sufficient to start a fire; but with the original HCN-CNCl technique, spontaneous combustion sometimes occurred. Safti-fume, in the form of briquettes, appears to have overcome this hazard by slowing the reaction.

In storage, HCN, Zyklon, HCN discoids, ethylene dichloride, ethylene oxide, and Safti-fume briquettes, somewhat increase the fire hazard. They are not themselves likely to start a fire, but being inflammable may materially increase its proportions. In a fire Zyklon and discoid cans soon explode, without much violence, but the liberated combustible gases spread the flames. It requires a relatively hot fire to cause the explosion of the fumigants packed in heavy steel cylinders; but when these do let go the explosion is a violent and destructive one. Safti-fume briquettes contain sodium chlorate. The heat of a fire causes multiple small explosions of this chemical.

Fortunately, in cases where fire reaches stored fumigants, HCN is burned, the resultant gases being relatively innocuous. The same is true of ethylene dichloride and ethylene oxide, so that poisoning by the gases in such cases is not to be feared. This is not to be confused with fires starting in buildings under fumigation. In this case the already diffused gases are in too low concentration to burn, but quite sufficient to poison; and until removed by ventilation (which may be accomplished by the fire itself), they must be reckoned with.

Sulphur and carbon bisulphide are two fumigating materials which produce a poisonous gas, sulphur dioxide, when burned. When produced in dangerous quantities, however, it is intolerable without gas-mask protection.

CONCLUSION

In this talk the dangers and difficulties of fumigation have been somewhat overstressed. It is quite true, as has been frequently demonstrated, and is daily demonstrated in New York City, that trained fumigators can do their work and handle the most deadly gases with safety, both to themselves and to others. It is, on the other hand, quite as true that, in the hands of the ignorant or careless, fumigation is a menace to all concerned. Hydrocyanic-acid gas is a deadly gas. It is not, however, so deadly as popular belief would make it. A single whiff of it will not kill you; in fact in the great majority of instances a good many whiffs may be taken with safety. Yet, one unfamiliar with its effect should not needlessly expose himself. Above all remember this advice: Keep your head and do not be stampeded because there is cyanide. On the other hand, do not rush in headlong; stop a moment and think.

MORTALITY IN CERTAIN STATES DURING 1930, WITH COMPARATIVE FIGURES FOR RECENT YEARS [1]

For several years the United States Public Health Service has secured from State health departments current mortality data and has published from time to time death rates from certain important causes from as many States as could furnish the information to the

[1] From the Office of Statistical Investigations, United States Public Health Service.

service. The monthly data so collected are, of course, available for an annual summary also, and the tables here presented have been compiled to give a preliminary summary of mortality during 1930.[3]

The rates are computed from current and generally preliminary reports furnished by State departments of health. Because of (*a*) some lack of uniformity in the method of classifying deaths according to cause, (*b*) some delayed death certificates, and (*c*) various other reasons, these preliminary rates can not be expected to agree in all instances with final rates published by the Bureau of the Census; the final figures are based on a complete review and retabulation of the individual death certificates from each State. The preliminary rates given in the following tables are intended to serve as a current index of mortality until final figures are issued by the Bureau of the Census.

For purposes of comparison, the mortality records for a few preceding years are given. These comparative rates for preceding years are taken from the same source as are the current reports. Although final figures are often available for these earlier years, the preliminary figures are retained as being more nearly comparable with current preliminary rates.

Populations used throughout are revised estimates as of July 1 of each year based on the 1930 and 1920 censuses.

In Table 1 the death rates from all causes and from certain specific causes for groups of States have been brought together. The number of States included varies with the cause; but for a given cause the same States are included for each of the years from 1923 to 1930. Tables 2, 3, 4, and 5 show the States that are included in the summary for each disease presented in Table 1, and also the death rates from that cause in each of the States for each year. The death rates for the groups are repeated in those tables, but it seemed worth while to bring together in Table 1 the rates for the different causes and years in as large a group of States as possible. In every case all States for which data were available for the whole period 1923–1930 were used in making the summary. In addition, the detailed tables (Tables 2, 3, 4, and 5) show rates for 1930 and such other years as could be secured from States for which data were not available for the whole period.

The rates for the majority of the diseases included in Table 1 are based on reports from 17 States, with an aggregate population of nearly 56,000,000, or more than 45 per cent of the total population of the United States. Other causes in this table are based on fewer States, but the smallest population considered is more than 34,000,000. While the rates in these States may not be the same as those for the total registration area, it is highly probable that the trend in these

[3] The summary for 1929 was published in Public Health Reports for May 2, 1931.

rates will be comparable with the trend in the rates in the total registration area.

The death rate per 1,000 from all causes in the group of 19 States was 11.3 in 1930, as compared with 12.0 in both 1929 and 1928 and with 11.5 in 1927. Each of the years 1929 and 1928, it will be remembered, included part of the influenza epidemic of the winter of 1928–29. The year 1930 was free from any widespread influenza epidemic and the death rate from all causes is slightly below the low level of 1927. Considering individual States, out of the total of 25 States with data for both 1929 and 1930, 20 showed a decrease, 2 showed an increase, and in 3 States the rate was the same for the two years.

In 17 States for which infant mortality figures were available the infant death rate per 1,000 live births was 64 in 1930, as compared with 68 in 1929, and with 66 in the low year of 1927. The 1930 figure is the lowest of any of the years covered in this report. Of 21 States with data for both 1929 and 1930, only 4 failed to participate in the decline in infant mortality. Inasmuch as the death rate for malformations and diseases of early infancy changes very little from year to year, a line has been inserted in Table 1 to show the infant mortality from all causes except malformations and early infancy. Infant mortality from causes other than malformation and early infancy has declined 24 per cent since the year 1923, as against a decrease of 19 per cent for the same period in the infant mortality from all causes. Nearly one-half of the present infant mortality is due to malformations and diseases of early infancy, and this group of causes has decreased very little.

In the eight States for which maternal mortality figures are available throughout the period 1923–1930, the deaths of mothers per 1,000 live births have decreased slightly, but rather consistently, the rate of 5.8 in 1930 being the lowest for any of the years included. A comparison of 1930 with 1929 in the larger number of States for which data are available for those two years is less favorable, 10 of the 20 States showing a decrease in 1930 over 1929 with the other 10 States showing an increase.

The typhoid fever death rate in 1930 was not so favorable as in 1929, being, in the group of 17 States, 3.5, as compared with 3.2 in the preceding year. The 1930 rate, however, is the lowest of any year covered in the table except 1929. The increase in 1930 over 1929 was quite general, 18 of the 27 States with data for both years having higher rates in 1930 than in 1929 and 2 States having the same rates in the two years, with only 7 States showing a decrease.

The rather sharp decline of diarrhea and enteritis under 2 years of age was also interrupted in the year 1930, the rate being slightly greater than in 1929 but less than in any of the other years included

and not much more than one-half of the rate for the year 1923. Of 25 States with data available for both 1929 and 1930, 16 showed an increase and 9 a decrease in 1930 as compared with the preceding year.

It is a well-known fact that the diseases of children, such as measles, whooping cough, scarlet fever, and diphtheria, tend to occur in cycles, and therefore the death rate for any one year is a poor indicator of the average mortality from these diseases. The measles mortality in 1930 was slightly greater than in 1929, but less than in any other year since 1925. Of 27 States with data for the last two years, 18 showed increases and 9 decreases in 1930 over the preceding year. The death rate from whooping cough in 1930 was less than in any year included in the table. All but four of the 27 States with data for the past two years had a lower rate in 1930 than in the preceding year. The death rate from scarlet fever was also the lowest of any of the years included. Of the 27 States with data for the past two years, 18 showed a decrease, 5 an increase, and 4 remained the same in 1930 as in 1929. Diphtheria continued its almost uninterrupted decline, the rate of 4.2 in 1930 being little more than one-third of the rate in 1923. Of 27 States with data for 1929 and 1930, 22 decreased and only 3 increased in 1930 as compared with 1929, the other 2 States having the same rate in the two years.

The death rate from poliomyelitis was higher in 1930 than in either 1928 or 1929—in fact, only two years since 1923 showed higher rates. Of 26 States with data for the past two years 16 showed an increase, 9 a decrease, and 1 remained the same in 1930 as in 1929. Since 1929 had the lowest rate of any year included, the increases in 1930 over 1929 might be expected.

The meningococcus meningitis death rate in 1930 was less than in 1929, but was higher than in any of the other years included. The year 1929 seems to represent the peak of a gradual rise in the death rate from this disease. Of 26 States with data available for both years, 14 decreased, 11 increased, and 1 remained the same in 1930 as in 1929.

As already mentioned, influenza maintained a low level during 1930, the rate being less than that for any other year included and somewhat less than that for the low year of 1927. In each of the 27 States with data available for the past two years the rate was less in 1930 than in the epidemic year of 1929.

Pneumonia, likewise, was considerably lower in 1930 than in 1929 and 1928, but not quite down to the 1927 level. However, it was lower in 1930 than in any other year included except 1927. If influenza and pneumonia are considered together, the rate for 1930 is slightly below that for 1927. In 27 States with data on pneumonia mortality

available for the past two years, 17 decreased and 10 increased in 1930 as compared with 1929.

The death rate from tuberculosis continued an uninterrupted decline throughout the period included, the rate being 71.7 in 1930 as against 77.5 for the preceding year, and both of these rates are lower than those for any other year included. Since 1923 the rate has been reduced by more than 25 per cent. Of 27 States with data for 1929 and 1930, 24 showed a decrease and only 3 an increase in 1930 as compared with 1929.

The diabetes death rate was higher than in any preceding year included except 1928, which had the same rate as 1930. Although the trend appears to be upward, the increases have not been large, the rate for 1930 being 20.0 as compared with 19.7 in 1929. Of 24 States with data available for both years, 14 showed an increase and 10 showed a decrease in 1930 as compared with 1929.

The death rate for cancer was higher for 1930 than for any preceding year, although the increase over 1929 was small. The increase since 1923 was slightly less than 10 per cent. Of 25 States with data available for both years, 18 showed an increase and 7 showed a decrease in 1930 as compared with 1929.

At first glance it might appear that the death rate from heart diseases had reached a peak in 1929, for the rate for 1930 is somewhat less than that for either 1929 or 1928. The 1930 rate, however, is considerably above that for 1927 and the rates for the other preceding years included. In connection with any comparison of the 1930 rate with 1929 and 1928 it must be remembered that the winter of 1928–29 included an influenza epidemic, and during all of the influenza epidemics of recent years there have occurred considerable numbers of deaths from causes other than influenza and pneumonia in excess of the normal expectation for such diseases. This is particularly true of heart disease and to a lesser extent of the other chronic diseases. It is, therefore, probable that the decrease in the heart disease rate for 1930 as compared with 1929 and 1928 is the reflection, not so much of a low rate in 1930 as of an abnormally high rate during the influenza epidemic of 1928 and 1929. The decrease in 1930 as compared with 1929 was rather general, 15 of the 23 States with data available for both years showing a decrease and 8 showing an increase. A comparison of 1930 and 1927, however, for which years 13 States had comparable data available, shows that each of these States had a higher rate in 1930 than in 1927.

The death rate from nephritis was less in 1930 than in any year since 1925. Of 24 States with data available for the past two years, 10 showed a decrease and 14 an increase in 1930 as compared with 1929. During the period 1923–1930 nephritis death rates fluctuated considerably, but the 1930 rate is only slightly above the 1923 rate.

The death rate from cerebral hemorrhage, apoplexy, was less in 1930 than in any of the other years included. The decline, however, has been small; of 21 States with data available for the last two years, 10 showed a decrease and 11 an increase in 1930 as compared with 1929.

TABLE 1.—*Summary of mortality from certain causes in a group of States, 1923–1930*

Diseases (numbers in parentheses are from the International List of Causes of Death, third revision, Paris, 1920)	1930	1929	1928	1927	1926	1925	1924	1923	Number of States included [1]	Estimated population as of July 1, 1930 (in thousands)
	Death rate per 1,000 population									
All causes	11.3	12.0	12.0	11.5	12.4	12.0	11.9	12.5	19	62,725
	Deaths under 1 year per 1,000 live births									
Total infant mortality	64	68	69	66	75	75	73	79	17	53,004
All except malformations and early infancy	35	37	38	34	41	42	42	46	9	29,872
	Deaths of mothers per 1,000 live births									
Maternal mortality	6.8	6.2	6.4	6.4	6.6	6.7	6.5	7.0	8	34,693
	Death rate per 100,000 population									
Typhoid fever (1)	3.5	3.2	4.0	5.0	5.9	7.4	6.0	6.3	17	55,971
Measles (7)	3.1	2.5	4.0	3.2	8.1	2.4	6.1	11.6	17	55,971
Scarlet fever (8)	1.7	2.0	1.8	2.0	2.3	2.7	3.2	3.9	17	55,971
Whooping cough (9)	4.2	6.0	5.2	6.1	6.8	6.9	8.0	9.4	17	55,971
Diphtheria (10)	4.2	5.5	6.6	7.2	7.1	7.6	9.1	12.3	17	55,971
Influenza (11)	18.9	54.0	43.1	23.0	41.0	29.4	19.3	42.4	17	55,971
Acute anterior poliomyelitis (22)	1.4	.7	1.2	1.8	.8	1.6	.9	.8	11	41,897
Meningococcus meningitis (24)	2.6	3.0	1.6	1.1	1.1	1.0	.9	1.2	13	45,020
Tuberculosis, all forms (31-37)	71.7	77.5	81.4	82.6	89.7	90.0	93.3	96.9	18	57,854
Cancer (43-49)	100.7	100.0	100.6	98.1	97.1	94.6	92.0	92.0	18	57,854
Diabetes mellitus (57)	20.0	19.7	20.0	18.1	18.5	16.9	16.6	17.8	11	38,952
Cerebral hemorrhage, apoplexy (74)	92.0	95.4	98.0	93.0	95.0	98.0	101.0	99.2	10	34,039
Heart diseases (87-90)	223.1	230.0	228.0	210.3	211.0	196.0	185.0	181.1	12	42,188
Pneumonia, all forms (100, 101)	82.5	94.0	99.0	80.0	103.0	99.3	102.1	115.3	17	55,432
Diarrhea and enteritis, under 2 years (113)	18.5	17.5	19.2	20.1	26.0	32.5	29.0	34.0	16	52,168
Nephritis, all forms (128-129)	97.7	98.5	102.3	98.8	103.9	97.0	94.0	95.3	13	40,358

[1] See Tables 2, 3, 4, and 5 for names of States included. The District of Columbia is counted as a State in this column.

TABLE 2.—*Mortality from all causes in certain States and in a group of insured wage earners, 1923–1930*

State	Death rate per 1,000 population (all causes)							
	1930	1929	1928	1927	1926	1925	1924	1923
States with complete data:								
Total (18 States and District of Columbia)	11.3	12.0	12.0	11.5	12.4	12.0	11.9	12.5
Alabama	11.2	12.2	12.0	10.3	11.7	11.6	11.5	11.0
Arizona	14.6	15.7	15.3	14.1	14.1	14.7	14.6	13.4
California	11.6	11.9	12.6	12.1	12.1	12.2	12.9	13.0
Connecticut	10.5	11.3	11.3	10.8	12.0	11.8	11.5	12.2
District of Columbia	15.2	15.4	15.1	14.8	15.8	15.1	14.3	15.6
Indiana	11.6	12.2	12.2	11.5	12.9	12.5	12.1	12.8
Kansas	10.4	10.4	11.2	10.0	10.4	10.2	9.8	10.9
Louisiana	11.8	11.8	12.2	11.9	12.2	12.7	12.9	11.7
Maryland	13.2	13.5	13.6	13.3	14.9	14.2	13.7	14.7
Michigan	10.6	11.8	11.8	11.4	12.7	11.8	12.2	12.7
Minnesota	9.7	9.9	10.1	9.8	10.3	10.2	10.0	10.4
Nebraska	9.4	9.6	10.0	9.1	9.4	9.3	9.3	9.5
New Jersey	10.7	11.5	11.9	11.2	12.2	11.8	11.9	12.2
New York (exclusive of New York City)	12.4	13.4	13.1	12.8	14.0	13.4	13.3	14.1
Ohio	11.4	12.5	12.4	11.5	12.5	11.8	11.4	12.4
Pennsylvania	11.3	11.9	12.1	11.4	12.5	12.2	12.1	13.1
Tennessee	11.4	12.2	12.2	11.4	12.5	11.2	11.4	11.8
Virginia	11.7	12.0	12.6	12.0	13.0	12.4	12.4	13.1
Wisconsin	11.3	10.7	10.5	10.3	10.6	10.3	10.1	10.6
Other States:								
Florida	13.2							
Georgia	11.8	11.8						
Hawaii	10.4	12.2	11.8					
Idaho	9.2							
Iowa	10.6	10.4	10.4					
Mississippi	10.8	11.6						
Montana	9.8							
North Carolina	11.4	11.9	11.7					
South Dakota	8.5	8.6	9.0					
West Virginia	10.4	10.6						
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	8.3	8.9	8.7	8.4	8.9	8.5	8.5	9.0

TABLE 3.—*Infant mortality in certain States, 1923–1930*

State	Deaths under 1 year per 1,000 live births							
	1930	1929	1928	1927	1926	1925	1924	1923
	Total infant mortality							
States with complete data								
Total (16 States and District of Columbia)	64	68	69	66	75	75	73	79
Alabama	73	74	74	65	68	73	79	77
Arizona	121	129	143	127	116	133	140	128
California	59	63	62	63	63	69	67	72
Connecticut	60	68	62	59	72	73	69	76
District of Columbia	70	69	65	66	85	87	76	91
Indiana	58	66	64	60	72	68	66	71
Louisiana	80	76	81	77	74	89	94	82
Maryland	73	79	79	81	87	90	87	94
Michigan	63	67	69	68	78	76	72	80
Minnesota	47	48	54	52	57	60	56	61
Nebraska	49	52	53	51	59	58	55	57
New Jersey	57	61	65	61	72	69	65	68
New York (exclusive of New York City)	61	64	65	63	74	71	71	79
Ohio	58	68	66	62	76	69	67	74
Pennsylvania	67	70	72	69	82	82	78	90
Tennessee	71	75	78	72	79	74	78	76
Virginia	71	74	76	75	84	80	76	83
Other States:								
Florida	64							
Georgia	78							
Hawaii	82	101						
Idaho	51							
Iowa	56	52	54					
Kansas	52	57	59					
North Carolina	77							
South Dakota	59	56	59					
Wisconsin	56	61	61					

TABLE 3.—*Infant mortality in certain States, 1923–1930*—Continued

State	Deaths under 1 year per 1,000 live births							
	1930	1929	1928	1927	1926	1925	1924	1923
	All except malformations and early infancy							
States with complete data:								
Total (8 States and District of Columbia)	35	37	38	34	41	42	42	46
Alabama	45	44	48	36	40	41	44	38
Arizona	84	93	105	94	81	97	102	94
California	29	32	33	31	31	35	35	39
District of Columbia	36	34	28	27	42	43	35	45
Louisiana	49	48	50	46	45	54	55	51
Maryland	38	46	42	43	49	48	46	54
Nebraska	19	23	21	21	25	25	23	27
New York (exclusive of New York City)	24	27	27	26	33	33	32	38
Pennsylvania	36	38	38	35	47	46	47	53
Other States:								
Florida	31	-----	-----	-----	-----	-----	-----	-----
Idaho	24	-----	-----	-----	-----	-----	-----	-----
Indiana	28	-----	-----	-----	-----	-----	-----	-----
Iowa	22	21	20	-----	-----	-----	-----	-----
Kansas	22	26	29	-----	-----	-----	-----	-----
Michigan	27	31	-----	-----	-----	-----	-----	-----
Minnesota	17	18	-----	-----	-----	-----	-----	-----
Ohio	25	-----	-----	-----	-----	-----	-----	-----
South Dakota	26	27	28	-----	-----	-----	-----	-----
Tennessee	44	53	-----	-----	-----	-----	-----	-----

TABLE 4.—*Maternal mortality in certain States, 1923–1930*

State	Deaths of mothers per 1,000 live births							
	1930	1929	1928	1927	1926	1925	1924	1923
States with complete data:								
Total (8 States)	5.8	6.2	6.4	6.4	6.6	6.7	6.5	7.0
Arizona	4.7	4.6	4.8	5.8	7.0	4.5	5.0	5.1
California	5.3	5.2	5.6	5.8	5.5	6.0	5.9	6.7
Nebraska	5.3	5.4	6.0	5.9	6.6	5.7	6.3	5.8
New York (exclusive of New York City)	5.6	5.5	6.4	6.3	6.1	6.1	6.0	6.3
Ohio	5.5	6.6	6.2	6.2	6.8	6.6	6.3	7.1
Pennsylvania	5.6	5.8	5.8	6.1	6.1	6.2	6.1	6.3
Tennessee	7.9	8.1	8.2	6.8	6.8	7.8	7.5	8.1
Virginia	6.6	6.5	7.5	6.3	8.0	6.9	6.4	7.3
Other States:								
Alabama	8.1	8.3	8.2	7.0	-----	-----	-----	-----
District of Columbia	9.1	6.1	-----	-----	-----	-----	-----	-----
Florida	9.5	-----	-----	-----	-----	-----	-----	-----
Georgia	10.6	-----	-----	-----	-----	-----	-----	-----
Idaho	4.4	-----	-----	-----	-----	-----	-----	-----
Indiana	5.8	7.0	6.1	6.5	-----	-----	-----	-----
Iowa	7.0	5.4	5.3	-----	-----	-----	-----	-----
Kansas	7.0	6.1	7.4	-----	-----	-----	-----	-----
Louisiana	9.8	10.3	11.1	-----	-----	-----	-----	-----
Maryland	5.3	5.6	-----	-----	-----	-----	-----	-----
Michigan	5.9	6.1	-----	-----	-----	-----	-----	-----
Minnesota	4.8	3.9	-----	-----	-----	-----	-----	-----
New Jersey	5.7	5.3	-----	-----	-----	-----	-----	-----
North Carolina	7.6	-----	-----	-----	-----	-----	-----	-----
South Dakota	5.6	5.5	4.3	-----	-----	-----	-----	-----
West Virginia	5.7	5.3	-----	-----	-----	-----	-----	-----
Wisconsin	4.8	-----	-----	-----	-----	-----	-----	-----

TABLE 5.—*Mortality from certain causes in several States and in a group of wage earners, 1923–1930*

State	Rate per 100,000 population							
	1930	1929	1928	1927	1926	1925	1924	1923
TYPHOID FEVER (1)								
States with complete data:								
Total (16 States and District of Columbia)	3.5	3.2	4.0	5.0	5.9	7.4	6.0	6.3
Alabama	7.7	7.5	9.4	12.4	15.1	16.8	14.2	14.7
Arizona	9.6	14.0	8.4	10.3	6.0	12.1	8.7	8.7
California	1.7	1.7	2.0	2.1	2.4	2.5	5.2	3.6
Connecticut	.9	.9	.6	1.1	1.9	2.6	2.6	2.6
District of Columbia	3.3	2.7	3.1	2.1	2.6	5.4	4.1	5.9
Indiana	3.7	3.5	4.4	4.8	6.5	8.0	7.0	6.8
Louisiana	11.7	10.4	12.3	14.0	16.8	33.0	21.4	14.0
Maryland	6.2	4.3	5.3	5.9	7.7	7.4	6.4	6.6
Minnesota	1.0	.9	.5	1.1	1.1	1.9	1.5	2.5
Nebraska	1.6	1.8	1.8	2.7	1.8	2.7	2.2	3.1
New Jersey	1.1	1.4	1.7	1.3	2.6	3.1	2.7	3.0
New York (exclusive of New York City)	1.6	1.5	2.0	2.1	3.4	3.8	3.5	3.4
Ohio	3.3	2.2	2.1	2.7	4.5	5.3	3.6	5.0
Pennsylvania	2.6	2.1	2.0	2.6	3.7	4.8	3.8	4.8
Tennessee	12.2	11.9	13.5	20.5	24.6	25.8	23.8	21.3
Virginia	5.8	4.4	6.1	7.3	11.2	12.8	8.7	10.8
Wisconsin	.9	1.4	.8	1.4	1.5	2.0	1.0	2.2
Other States:								
Florida	4.8							
Georgia	16.4	11.6						
Hawaii	2.4	3.9	6.3					
Idaho	4.7							
Illinois	1.9	1.4	2.2	2.4	3.2	4.6		
Iowa	1.6	2.3	2.3					
Kansas	3.0	2.9	2.4					
Michigan	1.8	1.7						
Mississippi	16.2	8.8						
Montana	3.2							
North Carolina	4.4	5.5	6.0					
South Carolina	16.9	14.4	19.5	23.7	28.0	26.2		
South Dakota	2.9	3.2	2.9					
West Virginia	12.1	11.5						
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	2.4	2.4	2.7	4.7	4.2	4.6	4.4	5.2
DIARRHEA AND ENTERITIS UNDER 2 YEARS (113)								
States with complete data.								
Total (15 States and District of Columbia)	18.5	17.5	19.2	20.1	26.0	32.5	29.0	34.0
Alabama	28.8	27.1	35.1	30.0	36.2	31.4	33.7	34.9
Arizona	76.7	118.6	105.6	87.9	76.9	126.8	123.0	100.3
California	14.8	15.3	15.6	19.3	20.3	24.8	25.8	33.6
Connecticut	10.7	14.0	6.9	11.3	16.4	18.9	20.1	21.6
District of Columbia	19.9	18.4	14.6	12.2	27.3	36.2	24.4	30.8
Indiana	18.4	16.9	17.7	17.0	26.5	30.9	25.5	28.2
Louisiana	27.1	26.2	24.9	36.7	32.8	54.8	50.5	32.7
Maryland	38.9	32.5	29.6	29.2	36.3	48.8	43.2	50.9
Minnesota	6.8	4.1	7.4	6.6	9.9	13.5	11.2	14.8
Nebraska	8.3	6.6	9.9	9.4	13.6	17.3	13.9	16.1
New Jersey	11.5	12.2	14.7	16.4	20.2	26.0	26.1	29.9
New York (exclusive of New York City)	10.4	11.3	12.2	13.8	18.6	24.8	21.3	27.7
Ohio	16.4	12.5	14.6	14.3	23.3	27.9	17.6	27.7
Pennsylvania	22.5	19.7	22.2	23.4	32.5	43.2	36.5	47.9
Tennessee	28.0	23.9	32.0	25.9	37.7	35.6	34.1	34.7
Wisconsin	11.2	11.7	11.1	14.1	15.4	20.5	14.8	18.8
Other States:								
Florida	16.2							
Georgia	24.8	17.9						
Hawaii	76.6	103.1	82.8					
Idaho	4.7							
Iowa	6.6	3.9	6.1					
Kansas	12.1	10.4	16.9	20.8	29.2	39.7		
Michigan	14.4	16.0						
Mississippi	15.0	19.2						
Montana	17.3							
North Carolina	20.7	30.1	30.1					
South Dakota	11.0	5.5	9.2					
Virginia	26.1	19.7						
West Virginia	70.1	57.8						
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over, including adults as well as children under 2 years	8.0	7.9	8.7	9.1	10.5	12.3	11.3	11.1

Table 5.—*Mortality from certain causes in several States and in a group of wage earners, 1923–1930*—Continued

State	Rate per 100,000 population							
	1930	1929	1928	1927	1926	1925	1924	1923
MEASLES (7)								
States with complete data:								
Total (16 States and District of Columbia)	3.1	2.5	4.0	3.2	8.1	2.4	6.1	11.6
Alabama	2.9	2.4	8.7	4.5	5.0	.8	16.1	12.3
Arizona	19.2	(1)	5.0	6.6	1.3	3.6	8.3	4.9
California	5.2	.3	.5	6.2	2.1	.6	7.1	7.2
Connecticut	.3	3.0	3.8	1.3	12.8	2.6	3.2	11.0
District of Columbia	.2	(1)	3.6	(1)	7.3	.9	.7	7.5
Indiana	1.9	3.7	2.0	1.7	12.0	1.9	5.7	8.5
Louisiana	4.7	2.5	8.6	12.5	.4	.4	23.0	6.2
Maryland	.4	1.4	6.6	1.3	14.1	1.5	3.3	9.7
Minnesota	3.3	3.2	.5	2.3	7.1	.6	5.6	11.5
Nebraska	6.2	2.4	.7	5.2	1.6	(1)	7.1	3.0
New Jersey	3.2	.9	6.4	.6	11.0	3.3	5.3	10.2
New York (exclusive of New York City)	1.4	2.6	3.5	2.6	4.6	3.0	4.5	8.1
Ohio	2.8	3.5	2.9	.6	12.5	1.3	2.6	9.6
Pennsylvania	2.2	3.7	5.0	2.6	11.4	5.5	3.3	18.1
Tennessee	4.9	1.0	7.8	5.4	10.8	2.0	10.4	19.6
Virginia	3.9	1.6	6.4	4.6	4.2	3.2	9.2	22.8
Wisconsin	3.3	2.7	.5	3.4	5.1	2.2	2.7	7.1
Other States:								
Florida	4.3							
Georgia	4.4	1.0						
Hawaii	4.3	5.0	2.3					
Idaho	2.0							
Illinois	1.0	3.6	1.1	4.0	4.8	3.1		
Iowa	8.1	1.4	.5					
Kansas	4.2	2.4	1.0					
Michigan	4.7	3.1						
Mississippi	1.4	4.3						
Montana	2.2							
North Carolina	.1	.6	16.6					
South Carolina	.5	.1	16.1	3.8	.3	.1		
South Dakota	3.0	2.2	1.6					
West Virginia	4.9	4.5						
Industrial policyholders Metropolitan Life Insurance Co., ages 1 and over	2.2	2.4	4.2	3.4	8.0	2.5	5.7	8.4
WHOOPING COUGH (9)								
States with complete data:								
Total (16 States and District of Columbia)	4.2	6.0	5.2	6.1	8.8	6.9	8.0	9.4
Alabama	8.9	9.8	7.7	13.6	11.8	9.0	15.9	13.3
Arizona	9.6	8.2	9.8	6.4	4.0	9.0	11.1	14.9
California	3.5	5.0	6.4	3.8	3.4	10.1	3.7	7.7
Connecticut	2.0	2.6	6.4	2.6	6.2	7.5	5.3	9.1
District of Columbia	4.1	5.0	4.6	3.6	8.3	4.5	2.8	7.5
Indiana	3.0	5.4	4.3	5.6	12.4	5.5	9.6	8.6
Louisiana	5.9	5.4	8.8	10.4	9.0	10.9	7.2	14.3
Maryland	4.4	7.9	7.4	12.1	11.7	11.3	9.1	17.2
Minnesota	2.6	4.5	3.1	3.0	7.0	3.9	5.4	6.2
Nebraska	2.6	3.6	3.2	3.7	7.6	5.6	2.1	5.7
New Jersey	2.2	4.7	4.7	4.6	4.6	6.8	7.3	6.4
New York (exclusive of New York City)	4.0	3.8	3.9	3.7	7.2	3.4	5.7	6.1
Ohio	3.0	8.0	3.8	4.2	10.3	5.8	7.5	8.3
Pennsylvania	3.7	5.7	5.5	4.7	10.0	7.0	7.6	11.0
Tennessee	6.3	7.4	5.2	13.3	14.6	6.6	11.8	11.0
Virginia	10.8	10.9	7.7	18.9	12.4	10.7	21.8	17.1
Wisconsin	3.3	3.8	2.3	2.6	5.6	4.1	4.6	6.0
Other States:								
Florida	3.4							
Georgia	9.0	9.4						
Hawaii	3.5	27.9	4.3					
Idaho	4.3							
Illinois	2.1	3.4	3.7	4.2	5.1	4.4		
Iowa	3.7	4.1	3.2					
Kansas	3.5	3.9	5.0					
Michigan	3.6	5.4						
Mississippi	6.9	9.4						
Montana	3.0							
North Carolina	8.5	8.3	6.2					
South Carolina	10.8	12.7	10.0	13.7	5.2	7.7		
South Dakota	2.7	3.8	5.0					
West Virginia	12.0	12.8						
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	1.9	3.0	2.7	3.1	5.0	3.6	3.5	4.8

[1] No deaths.

TABLE 5.—*Mortality from certain causes in several States and in a group of wage earners, 1923–1930*—Continued

State	Rate per 100,000 population							
	1930	1929	1928	1927	1926	1925	1924	1923
SCARLET FEVER (8)								
States with complete data:								
Total (16 States and District of Columbia)	1.7	2.0	1.8	2.0	2.3	2.7	3.2	3.9
Alabama	1.2	1.4	.4	.9	.6	.8	.6	.8
Arizona	1.4	2.6	2.4	1.5	1.8	1.3	3.2	3.3
California	1.2	1.7	1.0	1.2	.9	1.4	2.3	2.8
Connecticut	1.6	.9	1.3	1.4	2.3	3.0	3.9	3.6
District of Columbia	2.3	2.3	1.5	1.7	1.5	1.1	1.7	2.4
Indiana	2.1	3.2	2.1	2.5	3.0	3.3	2.3	2.8
Louisiana	.6	.6	.5	.6	.6	.5	.4	.3
Maryland	2.1	2.3	.8	1.1	1.3	1.1	2.8	3.3
Minnesota	1.4	2.6	2.4	3.7	6.2	6.3	8.4	9.6
Nebraska	2.2	3.8	3.0	1.3	1.9	2.4	2.7	3.8
New Jersey	1.5	1.1	1.6	2.5	2.1	1.8	1.8	2.7
New York (exclusive of New York City)	1.4	2.0	2.0	1.9	2.1	2.1	3.4	3.3
Ohio	2.6	2.2	2.0	2.4	2.9	3.9	3.8	5.3
Pennsylvania	1.9	2.6	2.6	2.4	2.9	3.7	3.9	4.4
Tennessee	1.6	2.4	1.6	1.8	1.6	1.3	1.3	1.6
Virginia	1.1	1.5	1.0	1.3	1.3	1.7	1.4	1.9
Wisconsin	3.0	2.5	2.5	2.1	2.7	3.7	7.4	8.7
Other States:								
Florida	.3	----	----	----	----	----	----	----
Georgia	1.3	1.3	----	----	----	----	----	----
Hawaii	3	(1)	1.1	----	----	----	----	----
Idaho	2.0	----	----	----	----	----	----	----
Illinois	3.9	3.9	2.1	2.3	3.3	3.8	----	----
Iowa	2.5	2.2	2.2	----	----	----	----	----
Kansas	2.4	3.3	2.7	----	----	----	----	----
Michigan	2.7	3.0	----	----	----	----	----	----
Mississippi	.6	.3	----	----	----	----	----	----
Montana	2.8	----	----	----	----	----	----	----
North Carolina	1.2	1.7	1.2	----	----	----	----	----
South Carolina	.7	.9	.5	.2	.2	.3	----	----
South Dakota	.6	2.6	2.8	----	----	----	----	----
West Virginia	1.9	1.5	----	----	----	----	----	----
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	2.5	2.7	2.6	3.0	3.4	3.4	4.3	4.4
DIPHTHERIA (10)								
States with complete data:								
Total (16 States and District of Columbia)	4.2	5.5	6.6	7.2	7.1	7.6	9.1	12.3
Alabama	6.9	9.4	9.2	9.7	8.2	6.8	6.0	8.4
Arizona	8.4	6.1	6.0	5.6	5.3	5.7	6.3	9.2
California	3.4	3.4	6.0	5.2	6.0	5.7	15.7	15.3
Connecticut	2.0	3.9	5.6	6.1	5.4	8.4	11.4	12.8
District of Columbia	3.7	7.0	9.4	5.1	6.2	8.0	6.5	9.2
Indiana	4.1	4.7	5.7	7.0	5.8	5.5	7.9	13.9
Louisiana	5.0	6.6	7.0	9.9	7.3	6.5	6.0	7.7
Maryland	3.4	4.5	6.6	7.5	6.3	5.6	7.7	10.1
Minnesota	1.2	2.6	2.8	3.3	6.2	9.3	8.8	8.6
Nebraska	3.2	3.5	4.0	3.4	2.7	5.7	8.0	10.4
New Jersey	8.2	11.2	11.8	10.8	8.5	9.1	9.6	13.8
New York (exclusive of New York City)	2.6	3.5	4.0	4.8	4.6	6.4	7.1	9.0
Ohio	2.8	3.4	5.7	7.9	7.6	6.2	6.8	11.3
Pennsylvania	5.1	7.1	8.9	8.9	8.6	10.6	11.6	15.7
Tennessee	6.6	8.4	8.2	7.5	11.1	7.5	8.5	10.6
Virginia	6.1	7.8	7.7	6.4	9.6	10.0	9.2	14.4
Wisconsin	2.4	2.8	3.4	4.5	5.6	6.2	7.4	13.1
Other States:								
Florida	5.3	----	----	----	----	----	----	----
Georgia	4.5	6.0	----	----	----	----	----	----
Hawaii	11.3	8.9	16.9	----	----	----	----	----
Idaho	3.1	----	----	----	----	----	----	----
Illinois	7.1	9.9	8.7	8.9	5.7	5.8	----	----
Iowa	1.8	1.3	2.7	----	----	----	----	----
Kansas	3.6	3.6	3.3	----	----	----	----	----
Michigan	6.2	10.5	----	----	----	----	----	----
Mississippi	6.8	7.1	----	----	----	----	----	----
Montana	7	----	----	----	----	----	----	----
North Carolina	7.9	11.0	10.6	----	----	----	----	----
South Carolina	7.3	8.6	10.1	8.7	8.9	6.7	----	----
South Dakota	2.9	1.6	2.2	----	----	----	----	----
West Virginia	6.2	7.4	----	----	----	----	----	----
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	5.7	8.6	9.5	10.2	9.5	10.2	12.7	15.5

[1] No deaths.

Table 5.—*Mortality from certain causes in several States and in a group of wage earners, 1923–1930*—Continued

State	Rate per 100,000 population							
	1930	1929	1928	1927	1926	1925	1924	1923
ACUTE ANTERIOR POLIOMYELITIS (22)								
States with complete data:								
Total (10 States and District of Columbia)	1.4	0.7	1.2	1.8	0.8	1.6	0.9	0.8
California	2.8	.9	1.5	4.4	.6	3.1	.8	.8
Connecticut	1.2	.5	.8	1.0	.4	1.3	1.6	.7
District of Columbia	.6	.8	1.0	1.3	1.5	.9	.2	.2
Indiana	.7	.3	.2	1.4	.6	.9	.5	.8
Louisiana	2.3	.6	1.0	2.0	.7	.8	.6	.5
Maryland	.4	.2	1.6	.4	.8	.9	1.2	.5
Minnesota	1.6	.4	2.3	1.4	.6	5.8	1.3	.7
New York (exclusive of New York City)	1.9	1.2	1.7	1.0	2.0	2.0	1.8	1.1
Ohio	1.6	.6	1.1	2.5	.7	1.0	.6	.5
Pennsylvania	.5	.6	.8	1.1	.5	.7	.9	.7
Virginia	.8	1.3	1.3	1.5	1.1	1.2	1.1	1.2
Other States:								
Alabama	.8	1.0	.8	.9	1.0	.9		
Arizona	3.7	.7	3.1	6.9	.8	3.3	8	
Florida	1.1							
Georgia	1.1							
Hawaii	(1)	1.1	.3					
Idaho	1.3							
Illinois	.7	.2						
Iowa	1.7	.9	.7					
Kansas	3.6	.5	.5					
Michigan	.8	1.0						
Mississippi	.5	.6						
Montana	1.1							
Nebraska	3.4	.7						
New Jersey	.4	.4						
North Carolina	.4	.6	.6					
South Carolina	.9	.6	1.0	1.4	.9	2.2		
South Dakota	1.6	1.2						
Tennessee	1.0	1.2	1.6	1.3				
West Virginia	.6	.9						
Wisconsin	1.0	.4	.5					
Industrial policy holders, Metropolitan Life Insurance Co., ages 1 and over	1.1	.6	1.2	2.0	.7	1.4	1.0	.7
MENINGOCOCCUS MENINGITIS (24)								
States with complete data:								
Total (12 States and District of Columbia)	2.6	3.0	1.6	1.1	1.1	1.0	0.9	1.2
Arizona	16.4	16.6	6.2	.2	8	.5	.5	.3
California	2.8	6.9	2.2	2.0	2.1	.8	.9	1.1
Connecticut	.9	1.4	1.1	.6	.7	.8	1.6	3.1
District of Columbia	2.0	2.9	1.0	.6	.9	.6	(1)	1.3
Indiana	8.3	2.7	.2	.3	.3	.6	.4	.4
Louisiana	3.6	2.7	.8	1.2	1.1	.5	.6	.9
Minnesota	1.9	1.8	1.8	2.3	.6	.7	.5	.8
Nebraska	2.5	2.6	1.8	.7	1.3	1.0	.5	.8
New York (exclusive of New York City)	1.2	1.3	.7	.4	.4	1.0	.5	.6
Ohio	1.8	2.7	2.0	.7	.5	.8	.5	1.0
Pennsylvania	2.1	2.2	1.6	.7	.9	.9	.8	.9
Virginia	2.3	1.5	1.5	1.0	.9	1.1	1.4	.9
Wisconsin	2.0	3.7	3.3	4.1	4.1	3.8	4.1	4.6

[1] No deaths.

TABLE 5.—*Mortality from certain causes in several States and in a group of wage earners, 1923–1930*—Continued

State	Rate per 100,000 population							
	1930	1929	1928	1927	1926	1925	1924	1923
INFLUENZA (11)								
States with complete data:								
Total (16 States and District of Columbia)	18.9	54.0	43.1	23.0	41.0	29.4	19.3	42.4
Alabama	32.2	120.2	71.0	30.2	66.5	46.0	26.4	49.4
Arizona	16.9	18.4	62.8	26.4	49.7	35.2	17.7	38.2
California	9.1	20.0	40.2	13.7	23.5	15.8	11.2	20.5
Connecticut	13.4	38.8	22.6	18.8	36.7	27.1	19.5	38.6
District of Columbia	8.2	20.5	17.6	19.6	27.9	13.6	7.2	35.0
Indiana	19.7	59.2	59.6	25.4	50.3	43.8	23.0	56.1
Louisiana	39.9	79.1	62.0	29.6	64.9	49.4	31.2	41.2
Maryland	10.3	42.5	19.1	21.7	33.4	20.6	14.5	34.7
Minnesota	15.9	39.6	42.6	19.1	29.0	24.0	9.0	24.9
Nebraska	17.7	45.9	63.8	26.8	41.7	41.2	19.7	49.0
New Jersey	8.9	25.2	15.7	11.1	19.6	11.1	15.5	21.8
New York (exclusive of New York City)	9.9	37.2	18.2	13.8	30.0	14.8	11.1	28.3
Ohio	19.4	59.6	51.7	23.3	40.4	28.6	13.9	42.1
Pennsylvania	19.8	56.1	43.4	25.1	45.5	30.0	26.1	45.0
Tennessee	31.3	106.3	67.9	32.3	70.6	52.5	38.8	93.1
Virginia	29.4	91.9	47.2	45.9	63.8	44.5	34.2	85.1
Wisconsin	30.7	42.3	44.3	20.9	36.4	32.4	15.4	39.4
Other States:								
Florida	22.7							
Georgia	32.2	86.3						
Hawaii	10.5	17.6	24.4					
Idaho	11.2							
Illinois	11.7	34.5						
Iowa	26.9	51.5	55.3					
Kansas	29.3	51.3	81.2					
Michigan	11.9	37.3						
Mississippi	29.3	105.6						
Montana	22.9							
North Carolina	24.1	78.2	45.2					
South Carolina	49.7	80.4	76.6	19.4	33.9	22.9		
South Dakota	24.4	51.5	55.3					
West Virginia	27.8	91.2						
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	13.1	37.7	22.0	15.7	27.4	19.4	14.2	30.1
PNEUMONIA, ALL FORMS (100,101)								
States with complete data:								
Total (16 States and District of Columbia)	82.5	94.0	99.0	80.0	103.0	99.3	102.1	115.3
Alabama	85.8	88.0	99.2	68.0	96.0	105.6	118.8	90.8
Arizona	152.6	130.5	170.9	136.6	143.5	143.0	171.9	135.5
California	73.0	78.8	84.6	74.6	74.7	78.2	88.3	90.4
Connecticut	87.3	105.4	106.7	87.1	112.2	111.4	103.4	128.9
District of Columbia	122.1	143.3	133.3	121.8	172.1	138.0	161.4	223.4
Indiana	83.5	98.8	103.9	79.0	109.8	99.2	98.7	116.1
Kansas	54.2	58.0	62.5	50.3	59.0	65.3	68.0	89.0
Louisiana	91.5	85.9	96.0	43.8	59.5	105.2	110.5	95.0
Maryland	117.8	137.8	131.9	127.9	149.3	138.6	143.5	169.5
Minnesota	71.1	70.5	74.2	67.4	74.4	74.3	72.4	78.4
Nebraska	64.0	60.1	71.4	56.7	80.4	77.7	80.9	87.7
New Jersey	77.7	103.5	81.1	54.7	78.9	68.6	63.2	73.7
New York (exclusive of New York City)	83.1	104.4	97.9	86.6	114.3	98.1	92.4	115.5
Ohio	74.6	91.2	98.9	82.4	101.7	100.9	92.8	120.9
Pennsylvania	92.3	105.2	121.9	100.0	137.6	129.4	138.4	158.0
Tennessee	88.9	91.5	98.3	85.0	109.4	86.2	105.3	101.4
Wisconsin	72.6	74.6	88.1	66.3	84.4	90.4	90.9	107.5
Other States:								
Florida	59.0							
Georgia	81.1	77.0						
Hawaii	118.2	141.1	148.7					
Idaho	104.0							
Illinois	63.5	81.9	103.1	74.9	92.1	83.4		
Iowa	79.6	63.8	70.2					
Michigan	68.2	88.5						
Mississippi	60.9	62.7						
Montana	80.2							
North Carolina	92.9	90.3	93.5					
South Carolina	102.4	97.0	113.2	105.1	133.6	114.1		
South Dakota	58.1	62.6	68.5					
Virginia	83.7	70.2						
West Virginia	91.5	79.5						
Industrial policyholders Metropolitan Life Insurance Co., ages 1 and over	62.5	74.0	72.8	63.0	78.2	69.0	70.2	77.6

Table 5.—*Mortality from certain causes in several States and in a group of wage earners, 1923–1930*—Continued

State	Rate per 100,000 population							
	1930	1929	1928	1927	1926	1925	1924	1923
TUBERCULOSIS, ALL FORMS (31-37)								
States with complete data:								
Total (17 States and District of Columbia)	71.7	77.5	81.4	82.6	89.7	90.0	93.3	96.9
Alabama	82.0	84.6	80.6	86.5	93.7	99.2	96.2	98.2
Arizona	298.4	365.1	342.2	342.2	352.2	362.5	342.1	329.9
California	98.3	103.3	114.8	117.6	119.4	127.3	130.5	136.5
Connecticut	58.8	63.5	69.4	68.6	80.1	76.8	82.8	90.5
District of Columbia	116.8	116.6	120.6	127.9	123.9	118.1	121.9	127.2
Indiana	63.6	70.2	70.0	70.5	82.0	80.9	82.4	91.7
Kansas	36.8	37.8	40.0	34.9	40.6	42.6	41.9	41.3
Louisiana	84.1	85.3	87.7	93.7	101.7	104.4	109.7	108.6
Maryland	99.1	104.6	105.8	102.7	115.1	121.9	120.8	124.5
Minnesota	46.3	54.5	56.0	62.2	67.4	64.1	69.3	75.8
Nebraska	24.5	29.9	28.3	30.0	33.1	33.3	35.8	34.8
New Jersey	69.3	73.1	72.9	74.5	83.3	82.5	86.2	91.2
New York (exclusive of New York City)	66.4	72.4	76.2	77.7	85.1	89.0	91.8	96.0
Ohio	63.0	69.8	73.3	73.5	80.5	77.3	82.7	86.6
Pennsylvania	59.8	66.0	71.4	72.5	79.6	79.3	82.6	86.6
Tennessee	115.7	120.3	120.6	120.1	144.6	135.1	144.9	148.7
Virginia	85.0	91.4	103.9	105.8	111.5	114.6	115.3	123.6
Wisconsin	50.5	53.3	56.5	60.7	66.2	62.2	64.0	66.5
Other States:								
Florida	67.6							
Georgia	73.4	74.0						
Hawaii	102.3	110.4	124.0					
Idaho	32.9					78.1		
Illinois	59.6	68.8	73.4	76.3	76.4			
Iowa	33.1	32.6	34.9					
Michigan	59.8	66.1						
Mississippi	78.4	71.2						
Montana	62.3							
North Carolina	74.7	83.3	78.1					
South Carolina	76.5	78.1	85.4	88.9	94.7	94.6		
South Dakota	48.6	53.9	66.0					
West Virginia	65.4	68.0						
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over	80.9	87.3	90.6	93.8	99.5	98.2	104.4	110.5
DIABETES MELLITUS (57)								
States with complete data:								
Total (10 States and District of Columbia)	20.0	19.7	20.0	18.1	18.5	16.9	16.6	17.8
Alabama	8.1	8.9	9.7	8.2	7.8	6.7	5.6	5.5
Arizona	6.4	4.9	3.6	2.7	6.5	3.6	6.6	6.0
California	18.1	19.0	18.9	18.3	18.1	16.7	17.6	18.9
District of Columbia	26.6	27.7	27.8	23.0	22.4	15.5	17.6	18.0
Louisiana	12.1	11.2	11.8	11.2	11.1	8.5	8.1	8.9
Maryland	21.2	19.5	23.2	18.9	23.2	18.2	20.3	20.3
Nebraska	20.6	21.5	22.4	20.1	16.6	18.9	17.3	21.4
New York	27.8	26.5	25.1	24.5	23.9	22.7	21.5	23.4
Ohio	21.7	20.7	22.0	19.0	19.4	18.2	16.8	19.6
Pennsylvania	21.9	22.2	22.6	19.4	20.3	18.7	18.8	19.0
Virginia	14.3	11.9	12.3	13.8	13.0	11.4	10.6	12.1
Other States:								
Connecticut	17.9	17.5						
Florida	13.9							
Georgia	11.6	10.2						
Hawaii	13.0	12.6	7.2					
Idaho	7.8							
Indiana	15.7	15.0						
Iowa	21.0	18.4	19.3					
Kansas	20.9	21.4	20.4					
Michigan	18.1	19.7						
Minnesota	18.2	18.6	20.2					
Mississippi	8.9	7.3						
Montana	16.2							
New Jersey	23.1	23.0						
South Carolina	8.9	8.6	9.0	7.2	7.4	6.3		
South Dakota	16.9	18.8	18.2					
Tennessee	10.8	10.2	9.4					
West Virginia	12.5	9.7						

TABLE 5.—*Mortality from certain causes in several States and in a group of wage earners, 1923–1930*—Continued

State	Rate per 100,000 population							
	1930	1929	1928	1927	1926	1925	1924	1923
CANCER (43-49)								
States with complete data:								
Total (17 States and District of Columbia)	100.7	100.0	100.6	98.1	97.1	94.6	92.0	92.0
Alabama	51.9	50.2	50.3	50.3	45.9	44.5	45.3	42.5
Arizona	52.2	53.2	54.0	51.2	46.2	45.3	42.7	43.6
California	125.7	118.3	121.0	116.9	116.2	113.9	115.9	121.4
Connecticut	114.5	116.1	111.7	109.6	109.2	109.7	105.8	99.5
District of Columbia	136.7	131.8	127.2	127.7	122.8	119.6	116.1	106.3
Indiana	99.9	99.8	100.5	102.1	103.5	98.7	95.8	97.5
Kansas	96.4	92.6	99.1	99.4	91.0	83.6	76.5	79.7
Louisiana	68.0	64.4	64.7	65.0	63.0	60.8	60.0	57.7
Maryland	111.4	109.8	115.7	101.1	108.7	104.8	103.8	108.4
Minnesota	119.9	113.9	114.1	108.7	105.7	109.7	103.7	101.9
Nebraska	100.9	94.5	96.5	92.6	88.8	89.2	80.7	78.9
New Jersey	107.1	109.3	105.1	103.8	102.8	103.0	97.2	92.2
New York (exclusive of New York City)	127.1	125.7	123.8	125.5	122.4	121.6	120.5	117.7
Ohio	105.2	104.6	106.1	101.8	102.0	98.1	96.4	94.1
Pennsylvania	94.8	99.5	102.3	98.8	98.6	94.6	92.4	91.4
Tennessee	58.2	58.0	58.3	59.3	57.5	51.4	51.3	48.5
Virginia	61.6	62.8	70.1	65.6	65.1	65.0	62.8	61.4
Wisconsin	112.8	110.0	107.7	103.4	108.8	105.4	100.5	92.6
Other States:								
Florida	68.4	------	------	------	------	------	------	------
Georgia	52.2	48.8	------	------	------	------	------	------
Hawaii	59.6	64.5	62.2	------	------	------	------	------
Idaho	61.4	------	------	------	------	------	------	------
Iowa	110.8	107.8	112.0	------	------	------	------	------
Michigan	90.7	93.3	------	------	------	------	------	------
Mississippi	46.8	44.5	------	------	------	------	------	------
Montana	78.9	------	------	------	------	------	------	------
South Carolina	39.7	42.5	44.6	41.8	40.4	40.9	------	------
South Dakota	72.9	68.0	71.8	------	------	------	------	------
West Virginia	59.4	57.9	------	------	------	------	------	------
Industrial policy holders, Metropolitan Life Insurance Co., ages 1 and over	79.1	78.8	77.0	75.6	75.1	71.8	71.5	72.7
HEART DISEASES (87-90)								
States with complete data.								
Total (11 States and District of Columbia)	223.1	220.0	228.0	210.3	211.0	196.0	185.0	181.1
Alabama	127.0	135.0	133.2	102.6	108.0	101.0	94.0	78.7
Arizona	123.9	127.7	130.7	116.3	116.4	105.0	91.6	76.2
California	239.7	249.0	242.2	236.0	225.1	222.7	217.9	212.6
District of Columbia	315.9	325.5	314.8	282.1	281.1	285.4	214.3	227.8
Indiana	182.5	197.4	189.6	171.1	169.2	160.2	156.6	156.7
Louisiana	190.1	191.9	183.8	170.4	172.3	160.6	163.6	155.8
Maryland	245.2	239.2	237.5	229.2	233.0	209.8	194.6	203.6
Nebraska	159.4	166.0	171.5	156.6	107.5	122.1	117.9	96.4
New York (exclusive of New York City)	293.1	316.8	309.4	287.5	303.7	274.5	262.5	253.9
Ohio	225.3	227.1	222.7	207.5	204.9	183.9	171.7	174.1
Pennsylvania	231.4	235.3	237.8	218.3	223.4	203.0	187.9	189.5
Virginia	178.2	176.7	198.5	177.0	181.3	168.5	163.9	153.9
Other States:								
Connecticut	183.6	193.8	179.2	182.3	------	------	------	------
Florida	179.3	------	------	------	------	------	------	------
Georgia	138.0	124.5	------	------	------	------	------	------
Hawaii	121.4	118.2	112.9	------	------	------	------	------
Idaho	174.6	------	------	------	------	------	------	------
Iowa	195.8	215.4	212.9	------	------	------	------	------
Kansas	171.5	163.7	175.3	------	------	------	------	------
Michigan	229.6	245.8	------	------	------	------	------	------
Minnesota	173.4	155.3	153.8	------	------	------	------	------
Mississippi	104.3	97.2	------	------	------	------	------	------
Montana	139.4	------	------	------	------	------	------	------
New Jersey	232.1	246.0	------	------	------	------	------	------
South Dakota	123.5	126.5	121.5	------	------	------	------	------
Tennessee	130.3	128.9	124.1	------	------	------	------	------
West Virginia	116.6	112.7	------	------	------	------	------	------
Industrial policyholders, Metropolitan Life Insurance Co., ages 1 and over (other (organic) heart only (90))	146.4	149.0	144.4	134.7	136.4	128.7	125.2	128.7

TABLE 5.—*Mortality from certain causes in several States and in a group of wage earners, 1923–1930*—Continued

State	Rate per 100,000 population							
	1930	1929	1928	1927	1926	1925	1924	1923
NEPHRITIS (128, 129)								
States with complete data:								
Total (12 States and District of Columbia)	97.7	98.5	102.3	98.8	103.9	97.0	94.6	95.3
Alabama	96.9	89.2	88.6	78.8	83.4	81.2	71.6	77.4
Arizona	51.8	43.2	44.7	41.8	47.9	48.3	44.3	41.7
California	84.0	89.1	97.4	90.5	95.5	82.8	87.4	89.6
District of Columbia	160.4	162.7	156.9	170.3	156.3	144.8	133.8	132.2
Indiana	84.9	80.9	81.8	80.4	95.7	89.8	93.4	92.7
Louisiana	112.0	108.2	112.7	97.1	103.6	82.7	78.5	73.4
Maryland	149.9	151.3	140.0	151.3	158.7	150.1	141.4	139.3
Nebraska	58.6	68.5	65.2	47.8	49.4	56.1	58.9	57.3
New Jersey	102.2	99.5	103.4	96.3	101.4	96.9	104.5	103.4
New York (exclusive of New York City)	116.3	111.4	110.4	114.1	124.2	118.6	112.4	111.7
Ohio	78.4	84.7	88.2	89.8	89.1	76.9	80.3	80.7
Pennsylvania	100.5	104.8	111.9	103.6	110.8	107.2	99.9	104.3
Virginia	108.3	103.0	119.6	113.9	118.7	114.9	103.7	96.1
Other States.								
Connecticut	73.2	71.1						
Florida	121.2							
Georgia	73.2	71.6						
Hawaii	66.9							
Idaho	39.2							
Iowa	43.2	49.3	52.3					
Kansas	102.7	90.5	94.4					
Michigan	63.7	66.1						
Minnesota	52.2	56.2	57.7					
Mississippi	97.1	95.6						
Montana	73.1							
South Carolina	122.6	105.4	113.1	100.1	103.4	103.6		
South Dakota	45.7	53.7	40.2					
Tennessee	75.9	71.6						
West Virginia	61.3	54.3						
Industrial policyholders Metropolitan Life Insurance Co., ages 1 and over	68.9	70.6	71.8	70.8	74.9	71.2	66.5	69.6
CEREBRAL HEMORRHAGE, APOPLEXY (74)								
States with complete data:								
Total (9 States and District of Columbia)	92.0	95.4	98.0	93.0	93.0	98.0	101.0	99.2
Alabama	61.9	64.2	63.7	54.1	52.9	51.5	47.5	43.3
Arizona	49.3	47.6	42.1	48.0	35.6	35.2	36.2	38.2
District of Columbia	90.2	83.8	107.2	103.7	117.3	114.5	114.8	121.3
Indiana	108.1	108.4	111.2	102.6	109.5	105.7	106.2	101.3
Louisiana	61.8	60.3	64.9	66.3	61.4	66.3	61.0	53.4
Maryland	105.1	102.0	101.5	100.5	114.0	124.3	121.2	121.2
Nebraska	84.5	88.4	83.3	82.4	77.4	79.6	80.0	81.1
New York (exclusive of New York City)	104.5	114.9	115.3	112.5	121.6	120.0	131.1	128.7
Ohio	107.7	112.0	113.9	103.6	112.1	114.5	115.4	116.0
Pennsylvania	82.8	84.1	88.4	86.5	88.2	87.6	93.3	93.4
Other States								
California	81.9	80.2	86.2					
Florida	106.8							
Hawaii	48.3	53.9	61.9					
Idaho	71.3							
Iowa	95.8	97.1	79.9					
Kansas	99.7	108.9	113.1	99.0	100.1	94.9		
Michigan	89.9	93.6						
Minnesota	79.5	75.3						
Mississippi	66.6	64.9						
Montana	66.6							
New Jersey	80.4	83.4						
South Dakota	61.3	55.0	55.2					
Tennessee	62.9	58.8						
Virginia	95.8	89.4						
West Virginia	63.7	49.3						

COURT DECISION RELATING TO PUBLIC HEALTH

Maintenance of piggeries restrained.—(Michigan Supreme Court; Albaugh et al. *v.* Abbott et al., 235 N. W. 263; decided Feb. 27, 1931.) The plaintiffs, who owned and occupied farmhouses on or near a main thoroughfare, brought suit to restrain the defendants from maintaining piggeries on lands in the vicinity of plaintiffs' homes. The defendants hauled over 80 per cent of the garbage of the city of Battle Creek to their farms and there fed it to several hundred hogs. Because of the growth of Battle Creek, a few new houses had been erected in the vicinity of the homes of some of the plaintiffs. On the ground that the acts complained of constituted a nuisance, the supreme court restrained the defendants from collecting garbage and hauling the same to their respective lands and from maintaining piggeries, but gave the defendants three months in which to carry out the terms of the decree.

DEATHS DURING WEEK ENDED APRIL 11, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended April 11, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Apr. 11, 1931	Corresponding week, 1930
Policies in force	75, 140, 465	75, 730, 569
Number of death claims	17, 335	15, 055
Death claims per 1,000 policies in force, annual rate	12. 0	10. 4

Deaths [1] from all causes in certain large cities of the United States during the week ended April 11, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Apr. 11, 1931				Corresponding week, 1930		Death rate [2] for the first 15 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (81 cities)	9, 023	13 2	784	[4] 62	13 4	859	13 9	13. 4
Akron	56	11. 3	7	69	6. 3	6	8 6	8. 7
Albany [5]	46	18. 6	3	59	18. 4	4	15. 3	16. 8
Atlanta	83	15. 6	14	143	18. 8	5	16. 5	17. 3
White	40		8	127		4		
Colored	43	(6)	6	172	(6)	1	(6)	(6)
Baltimore [5]	249	16 0	21	71	16. 1	24	17. 3	15. 8
White	191		17	74		21		
Colored	58	(6)	4	62	(6)	3	(6)	(6)
Birmingham	82	15. 9	8	80	14. 3	7	15. 8	14. 4
White	38		1	17		2		
Colored	44	(6)	7	170	(6)	5	(6)	(6)
Boston	223	14. 8	19	54	16. 5	28	16. 5	16. 1
Bridgeport	35	12 4	4	66	11. 0	2	13. 1	14. 0
Buffalo	163	14. 6	15	61	14. 2	15	15. 4	14. 5
Cambridge	35	16. 0	3	60	11. 5	3	14. 2	14. 3
Camden	38	16. 7	3	52	10. 1	8	18. 3	15. 0
Canton	24	11. 7	2	46	8. 4	4	11. 2	11. 3
Chicago [5]	763	11. 5	70	62	11. 7	72	11. 9	11. 8

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended April 11, 1931, etc.—Continued

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Apr. 11, 1931				Corresponding week, 1930		Death rate for the first 15 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
Cincinnati	169	19.3	9	54	16.0	6	18.0	17.6
Cleveland	223	12.8	15	44	12.8	15	12.7	12.4
Columbus	89	15.7	6	59	15.4	8	15.3	15.3
Dallas	66	12.7	9		12.7	3	12.7	12.6
White	54		7			2		
Colored	12	(6)	2		(6)	1	(6)	(6)
Dayton	52	13.1	5	70	13.9	5	14.0	10.7
Denver	82	14.7	5	48	19.1	5	15.9	16.0
Des Moines	26	9.4	3	53	10.9	2	12.3	12.7
Detroit	296	9.3	26	41	12.1	58	9.7	10.6
Duluth	33	16.9	3	74	14.9	1	12.0	11.5
El Paso	30	14.9	6		20.3	10	18.5	18.7
Erie	29	12.8	3	56	9.9	1	11.6	11.3
Fall River [5, 7]	30	13.6	2	45	15.4	3	13.9	14.1
Flint	20	6.4	3	38	12.5	7	7.9	10.4
Fort Worth	46	14.3	7		8.9	1	12.2	12.1
White	39		7			1		
Colored	7	(6)	0		(6)	0	(6)	(6)
Grand Rapids	31	9.4	4	59	14.5	8	9.6	12.0
Houston	61	10.3	3		14.5	11	11.8	13.1
White	44		3			6		
Colored	17	(6)	0		(6)	5	(6)	(6)
Indianapolis	111	15.7	4	33	16.1	4	15.5	16.3
White	94		4	38		3		
Colored	17	(6)	0	0	(6)	1	(6)	(6)
Jersey City	82	13.4	10	89	13.6	15	13.8	12.8
Kansas City, Kans	30	12.7	0	0	9.0	0	15.6	12.7
White	21		0	0		0		
Colored	9	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo	108	13.8	10	76	16.2	9	15.4	14.6
Knoxville	27	12.9	4	85	10.8	3	14.4	15.6
White	19		3	71		3		
Colored	8	(6)	1	204	(6)	0	(6)	(6)
Long Beach	42	14.4	0	0	10.1	2	11.0	10.6
Los Angeles	288	11.4	33	96	11.7	31	11.7	12.2
Louisville	105	17.8	5	43	17.1	3	17.6	14.9
White	83		5	49		3		
Colored	22	(6)	0	0	(6)	0	(6)	(6)
Lowell [7]	20	10.4	1	25	11.4	2	14.8	15.0
Lynn	14	7.1	3	78	16.3	3	12.4	12.3
Memphis	79	15.9	5	53	16.2	9	18.4	18.1
White	48		1	17		7		
Colored	31	(6)	4	116	(6)	2	(6)	(6)
Miami	35	16.2	3	76	8.9	0	14.7	13.6
White	22		2	71		0		
Colored	13	(6)	1	88	(6)	0	(6)	(6)
Milwaukee	109	9.6	9	39	11.2	20	10.7	10.8
Minneapolis	106	11.7	18	116	9.3	9	12.4	11.2
Nashville	55	18.4	5	74	14.9	5	18.7	17.7
White	40		3	60		2		
Colored	15	(6)	2	118	(6)	3	(6)	(6)
New Bedford [7]	31	14.4	6	159	12.5	3	13.4	12.3
New Haven	52	16.7	3	57	9.0	2	13.7	14.4
New Orleans	160	17.8	20	110	20.5	16	19.5	19.6
White	83		9	74		8		
Colored	77	(6)	11	179	(6)	8	(6)	(6)
New York	1,616	11.9	124	52	12.7	169	13.4	12.3
Bronx Borough	216	8.5	9	20	9.1	21	9.7	8.7
Brooklyn Borough	550	10.9	56	59	11.8	70	12.5	11.4
Manhattan Borough	648	18.6	48	82	18.9	63	20.5	18.2
Queens Borough	165	7.5	9	25	8.2	13	8.7	8.0
Richmond Borough	37	11.8	2	36	14.7	2	14.3	15.2
Newark, N. J	119	13.9	5	26	14.2	21	13.9	14.1
Oakland	56	10.0	2	28	12.4	1	12.1	12.2
Oklahoma City	59	15.6	10	138	10.8	2	12.3	10.7
Omaha	51	12.3	6	67	13.6	8	14.9	14.4
Paterson	34	12.8	5	86	10.5	6	15.6	13.4
Philadelphia	613	16.3	47	68	12.6	41	16.0	14.1

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended April 11, 1931, etc.—Continued

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Apr. 11, 1931				Corresponding week, 1930		Death rate for the first 15 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
Pittsburgh	225	17.4	23	79	16 8	22	17.9	15.8
Portland, Oreg	60	10.2	5	61	12.1	8	12.8	13.8
Providence	67	13.7	3	28	17.3	4	15.2	15.7
Richmond	69	19.5	6	87	19.4	7	17 9	16.5
White	45		1	22		3		
Colored	24	(6)	5	217	(6)	4	(6)	(6)
Rochester	87	13.7	9	82	13.6	1	13 9	13.1
St. Louis	261	16 4	21	71	16.0	15	18.2	15.3
St. Paul	54	10.2	2	21	10 1	2	11.7	11.2
Salt Lake City [4]	46	16.8	1	15	17.4	4	13.4	14.7
San Antonio	60	13 0	7		12 5	8	15.0	18.4
San Diego	40	13.3	4	81	16.4	3	15.6	15.7
San Francisco	180	14.4	9	60	11.3	8	14.7	13.9
Schenectady	26	14 1	6	176	15.8	0	12.0	12.2
Seattle	80	11.2	2	19	12.9	5	13 8	12.0
Somerville	17	8.4	0	0	10.5	5	11.1	12.4
South Bend	18	8.7	4	100	11 4	2	9.4	10.0
Spokane	24	10 8	2	52	17.1	5	13 2	13.5
Springfield, Mass	35	12 0	2	31	14 2	5	13.9	14.6
Syracuse	48	11 7	5	59	15.4	6	12 8	13.1
Tacoma	26	12.6	0	0	15 1	1	15.2	13.6
Toledo	72	12.7	6	55	12 2	8	13.7	14.1
Trenton	44	18.5	8	139	16 5	3	19.8	18.0
Utica	37	18 9	0	0	17.9	1	16 7	16.8
Washington, D. C	177	18.7	22	122	16.6	13	18.4	16.2
White	103		9	74		5		
Colored	74	(6)	13	223	(6)	8	(6)	(6)
Waterbury	22	11.4	1	30	9.4	2	11.4	11.0
Wilmington, Del. [7]	46	22.5	4	86	20 1	4	17 0	16.2
Worcester	60	15 9	7	96	16 0	6	15.1	15 6
Yonkers	25	9 4	5	131	7.7	1	10 2	9.1
Youngstown	35	10 6	4	56	12 8	9	11.8	11.2

[1] Deaths of nonresidents are included Stillbirths are excluded

[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method

[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births

[4] Data for 76 cities

[5] Deaths for week ended Friday.

[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows Atlanta, 31; Baltimore, 15, Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans , 14; Knoxville, 15, Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32, and Washington, D. C., 25.

[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended April 18, 1931, and April 19, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended April 18, 1931, and April 19, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930
New England States:								
Maine	4	1	5	9	9	30	0	0
New Hampshire				5	21	5	0	0
Vermont	1	3			1	92	0	0
Massachusetts	52	72	7	16	522	1,071	2	2
Rhode Island	6	10		2	40	3	0	0
Connecticut	7	16	5	10	671	26	2	2
Middle Atlantic States:								
New York	126	115	[1] 13	[1] 21	2,577	1,871	15	16
New Jersey	62	117	12	20	909	1,314	2	2
Pennsylvania	63	130			4,374	1,800	8	10
East North Central States:								
Ohio	39	28	43	20	673	744	1	6
Indiana	16	16	33		855	121	6	20
Illinois	138	135	13	15	1,586	702	20	13
Michigan	45	66	5		105	1,874	11	38
Wisconsin	17	11	49	35	790	674	1	3
West North Central States:								
Minnesota	5	9		3	71	201	1	3
Iowa	6	4			56	427	1	8
Missouri	30	32	22	14	620	105	8	18
North Dakota	1	2			77	19	0	4
South Dakota	11	2			119	119	0	0
Nebraska	6	20			5	355	2	1
Kansas	13	12	16		48	812	1	0
South Atlantic States:								
Delaware	1	5	1		265	12	0	0
Maryland [2]	14	18	23	25	1,612	42	4	2
District of Columbia	18	5	4		287	26	5	0
Virginia								
West Virginia	13	13	40	14	99	122	0	5
North Carolina	30	32	17	24	940	62	3	6
South Carolina	7	12	702	639	138		2	3
Georgia [3]	7	11	215	76	123	228	0	0
Florida	7	2	14		206	282	1	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever: 1931, 5 cases, 1 case in Georgia and 4 cases in Alabama.

***Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended April 18, 1931, and April 19, 1930*—Continued**

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930
East South Central States:								
Kentucky					341	69	5	4
Tennessee	4	2	96	29	91	143	2	8
Alabama [3]	23	17	346	52	367	130	19	6
Mississippi	3	7					6	14
West South Central States:								
Arkansas	6	6	207	139	32	72	2	3
Louisiana	14	38	33	14	3	92	1	4
Oklahoma [4]	19	7	129	32	21	463	0	2
Texas	36	25	69	8	57	170	0	1
Mountain States:								
Montana	2	5			8	5	1	2
Idaho	1		2			7	0	2
Wyoming	1	1		2	4	23	0	0
Colorado	7	4			274	930	2	4
New Mexico	2	5	2		28	60	1	0
Arizona	1	2	43	1	36	128	1	8
Utah [1]	1	1	14	6	5	232	2	6
Pacific States:								
Washington	10	9	48		55	526	1	3
Oregon	5	5	55	25	150	99	0	1
California	49	46	77	18	1,461	1,766	3	14

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930
New England States:								
Maine	1	0	5	39	0	0	0	4
New Hampshire	0	0	1	10	0	0	0	0
Vermont	0	0	2	5	0	0	0	1
Massachusetts	1	0	374	232	0	0	2	3
Rhode Island	0	0	57	35	0	0	0	0
Connecticut	0	0	41	92	0	0	0	1
Middle Atlantic States:								
New York	2	2	897	557	4	4	11	17
New Jersey	0	0	340	242	0	0	3	3
Pennsylvania	1	1	483	469	1	1	14	16
East North Central States:								
Ohio	1	0	380	277	83	148	3	1
Indiana	1	0	276	191	109	167	0	1
Illinois	1	0	553	531	58	150	7	11
Michigan	3	0	333	294	14	88	10	0
Wisconsin	1	0	216	240	29	0	1	1
West North Central States:								
Minnesota	0	0	92	93	3	6	1	1
Iowa	0	0	78	62	81	111	0	1
Missouri	0	0	283	185	56	64	2	10
North Dakota	0	0	25	24	12	24	5	1
South Dakota	1	0	23	12	14	65	0	1
Nebraska	0	0	28	70	21	66	1	0
Kansas	0	0	59	141	93	107	1	5
South Atlantic States:								
Delaware	0	0	34	11	0	0	0	0
Maryland [1]	1	0	65	128	0	0	5	3
District of Columbia	0	0	27	23	0	0	0	1
Virginia		1						
West Virginia	1	0	50	44	4	0	4	12
North Carolina	0	0	50	50	0	21	1	4
South Carolina	1	0	8	5	4	6	7	3
Georgia [3]	0	0	71	22	0	0	1	6
Florida	1	0	5	10	0	0	4	3

[1] Week ended Friday.
[3] Typhus fever: 1931, 5 cases; 1 case in Georgia and 4 cases in Alabama.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended April 18, 1931, and April 19, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930	Week ended Apr. 18, 1931	Week ended Apr. 19, 1930
East South Central States:								
Kentucky	0	0	87	59	2	11	2	4
Tennessee	0	1	19	52	8	15	11	6
Alabama [3]	0	0	38	13	25	8	6	7
Mississippi	0	0	18	10	66	14	3	8
West South Central States:								
Arkansas	2	0	20	8	33	9	3	16
Louisiana	0	0	14	15	33	12	6	5
Oklahoma [4]	0	0	25	65	136	115	1	7
Texas	0	0	41	32	37	48	6	1
Mountain States:								
Montana	0	0	36	48	3	18	1	2
Idaho	0	0	4	7	2	1	1	0
Wyoming	0	0	16	3	7	4	0	0
Colorado	0	0	40	24	2	12	0	3
New Mexico	1	0	7	16	4	5	3	1
Arizona	0	0	4	14	3	21	0	4
Utah [2]	0	0	9	12	0	0	0	0
Pacific States.								
Washington	0	0	41	26	0	65	1	1
Oregon	0	2	19	20	20	27	1	2
California	4	0	155	147	53	77	9	13

[2] Week ended Friday.
[3] Typhus fever: 1931, 5 cases; 1 case in Georgia and 4 cases in Alabama.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
March, 1931										
Indiana	37	124	228		3,026		5	1,347	447	7
New Jersey	20	273	187		3,275		3	1,339	0	8
New York	76	534		2	8,213		5	4,119	36	37
Ohio	25	199	888	2	3,591		6	2,285	256	20
Pennsylvania	84	415			15,170	3	2	2,464	0	65
South Carolina		132	8,696	499	485	294	5	25	12	18
Vermont		4			25		0	43	0	0
Wyoming		2	3		14		0	121	16	4

March, 1931	Cases
Anthrax:	
New Jersey	2
New York	1
Pennsylvania	1
Chicken pox:	
Indiana	473
New Jersey	2,044
New York	3,038
Ohio	2,452
Pennsylvania	4,795
South Carolina	304
Vermont	68
Wyoming	107
Dengue:	
South Carolina	4
Diarrhea:	
South Carolina	318
Diarrhea and enteritis (under 2 years):	
Ohio	12
Dysentery:	
New Jersey	8
New York	8
South Carolina (amebic)	1
German measles:	
New Jersey	85
New York	1,394
Ohio	45
Pennsylvania	505
South Carolina	22
Hookworm disease:	
South Carolina	72
Lead poisoning:	
New Jersey	4
Ohio	7

	Cases
Lethargic encephalitis:	
New Jersey	6
New York	18
Ohio	4
Pennsylvania	9
Mumps:	
Indiana	84
New Jersey	267
New York	1,913
Ohio	1,803
Pennsylvania	2,228
South Carolina	139
Vermont	145
Wyoming	48
Ophthalmia neonatorum:	
New Jersey	4
New York	3
Ohio	57
Pennsylvania	6
South Carolina	9
Paratyphoid fever:	
New York	1
Ohio	1
Puerperal septicemia:	
New York	9
Ohio	7
Pennsylvania	21
Rabies in animals:	
New York	10
South Carolina	21
Rocky Mountain spotted or tick fever.	
Wyoming	1
Septic sore throat.	
Indiana	2
New York	23

	Cases
Septic sore throat—Continued.	
Ohio	97
Wyoming	1
Tetanus:	
New Jersey	2
New York	2
Pennsylvania	2
Trachoma:	
New Jersey	2
Ohio	1
Trichinosis:	
New Jersey	3
New York	8
Pennsylvania	3
Tularaemia.	
Ohio	7
Pennsylvania	2
Undulant fever:	
Indiana	2
New Jersey	4
New York	13
Ohio	5
Pennsylvania	3
Vermont	1
Vincent's angina.	
New York	[1] 82
Wyoming	1
Whooping cough:	
Indiana	232
New Jersey	708
New York	2,223
Ohio	440
Pennsylvania	1,007
South Carolina	182
Vermont	96
Wyoming	64

[1] Exclusive of New York City.

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of March, 1931, by departments of health of certain States to other State health departments

Disease	California	Connecticut	Illinois	Massachusetts	Minnesota	Missouri	New York	Oregon	Rhode Island	Washington
Diphtheria							2			
Malaria	1									
Measles							2			
Meningitis						2	[1] 1			
Poliomyelitis					1					
Scarlet fever		2					2			
Smallpox	3		1							
Tuberculosis			21		16			1	2	1
Tularemia					1					
Typhoid fever				1	2					
Undulant fever					1					
Whooping cough							1			

[1] Meningococcus.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated population of more than 33,285,000. The estimated population of the 90 cities reporting deaths is more than 31,820,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended April 11, 1931, and April 12, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	898	1,039	
96 cities	417	586	803
Measles:			
45 States	20,891	18,776	
96 cities	8,501	7,348	
Meningococcus meningitis:			
46 States	168	314	
96 cities	85	155	
Poliomyelitis:			
46 States	20	22	
Scarlet fever:			
46 States	5,545	5,216	
96 cities	2,290	2,007	1,492
Smallpox:			
46 States	1,056	1,580	
96 cities	125	179	59
Typhoid fever:			
46 States	124	147	
96 cities	32	29	31
Deaths reported			
Influenza and pneumonia:			
90 cities	1,061	1,078	
Smallpox:			
90 cities	1	0	
New Orleans, La.	1	0	

City reports for week ended April 11, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	6	0	0	1	0	1	9	1
New Hampshire:								
Concord	0	0	0		0	16	0	5
Vermont:								
Barre	0	0	0		0	1	0	2
Burlington	0	0	0		0	0	0	0
Massachusetts:								
Boston	59	30	17	2	1	118	3	22
Fall River		3						
Springfield	1	3	1		0	13	88	2
Worcester	1	4	2		0	7	10	5
Rhode Island:								
Pawtucket	5	0	0		0	0	0	4
Providence	8	8	12	1	2	38	3	6
Connecticut:								
Bridgeport	6	5	0		0	7	3	4
Hartford	4	4	1	1	2	47	2	12
New Haven	22	1	0		3	275	5	6

City reports for week ended April 11, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
MIDDLE ATLANTIC								
New York:								
Buffalo	21	10	10	5	0	273	38	22
New York	323	215	89	20	11	1,355	42	218
Rochester	7	7	0		1	12	3	8
Syracuse	15	4	1		0	4	0	4
New Jersey:								
Camden	2	6	4		0	15	6	6
Newark	88	15	10	5	0	27	2	15
Trenton	4	3	1	6	0	3	8	10
Pennsylvania:								
Philadelphia	150	59	6	14	12	1,315	52	40
Pittsburgh	79	15	12	5	3	112	41	51
Reading	9	2	0		0	64	24	1
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	9	7	4		3	93	35	11
Cleveland	215	26	6	28	4	59	322	26
Columbus	13	3	2	2	2	12	5	4
Toledo	62	3	8	4	4	6	26	8
Indiana:								
Fort Wayne	1	2	4		3	24	0	7
Indianapolis	44	4	1		0	468	28	15
South Bend	6	0	0		0	1	0	2
Terre Haute	3	0	0		0	3	0	0
Illinois:								
Chicago	119	93	99	6	5	373	85	82
Springfield	12	1	1		0	180	0	4
Michigan:								
Detroit	69	42	18	2	2	19	29	26
Flint	11	3	2	7	1	0	3	2
Grand Rapids	4	1	0		1	5	0	1
Wisconsin:								
Kenosha	17	0	0		0	1	111	1
Madison	20	0	0	1		6	45	
Milwaukee	156	12	4	2	2	123	473	10
Racine	3	2	0		0	7	0	0
Superior	18	0	0		0	0	0	3
WEST NORTH CENTRAL								
Minnesota:								
Duluth	0	0	0		1	0	1	2
Minneapolis	116	11	4		0	105	229	16
St. Paul	50	7	0	2	2	20	3	5
Iowa:								
Davenport	0	1	0			3	0	
Des Moines	1	1	4			0	0	
Sioux City		1						
Waterloo	3	0	0			0	0	
Missouri:								
Kansas City	20	3	4		0	172	0	19
St. Joseph	3	1	1		0	10	1	13
St. Louis	28	36	17	5	1	45	13	13
North Dakota:								
Fargo	2	0	0		1	1	4	1
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	6	0	0			6	1	
Nebraska:								
Omaha	19	2	5		0	1	32	8
Kansas:								
Topeka	12	1	2	1	0	0	50	0
Wichita	20	2	0		0	1	3	9
SOUTH ATLANTIC								
Delaware:								
Wilmington	3	2	1		0	127	3	10
Maryland:								
Baltimore	86	23	9	6	2	1,086	31	41
Cumberland	0	0	0		0	1	0	0
Frederick	0	0	0		0	9	0	0
District of Columbia:								
Washington	14	11	5	3	2	373	0	18
Virginia:								
Lynchburg	18	1	0		0	14	0	2
Norfolk	14	0	2		0	253	3	8
Richmond	1	2	0		0	293	0	3
Roanoke	5	0	2		1	13	0	0

City reports for week ended April 11, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
SOUTH ATLANTIC—con.								
West Virginia:								
Charleston	0	0	1		0	0	0	2
Wheeling	31	0	0		1	1	0	1
North Carolina:								
Raleigh	10	1	2		0	89	0	1
Wilmington	0	0	0		1	0	0	2
Winston-Salem	14	0	2		0	35	28	2
South Carolina:								
Charleston	0	0	0	30	0	10	0	2
Columbia	2	0	0		0	0	4	3
Greenville	1	0	0		0	0	0	0
Georgia:								
Atlanta	13	2	2	51	6	50	0	12
Brunswick	0	0	0		0	0	16	1
Savannah	3	1	0	7	0	4	4	1
Florida:								
Miami	7	3	2	2	0	12	0	2
St. Petersburg		0			0			0
Tampa	9	1	1	2	2	197	0	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0		0	66	0	3
Tennessee:								
Memphis	48	3	1		3	90	5	9
Nashville	0	1	1		1	73	0	2
Alabama:								
Birmingham	1	1	1	12	6	72	1	9
Mobile	0	0	0		1	0	0	5
Montgomery	2	0	0			0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	5	0	0			2	0	
Little Rock	7	0	0		0	2	5	8
Louisiana:								
New Orleans	10	11	12	8	6	0	0	8
Shreveport	8	0	0		0	3	4	6
Oklahoma:								
Muskogee	11	1	0	8		0	3	
Tulsa	5	1	0			7	0	
Texas:								
Dallas	40	5	2	7	3	3	41	9
Fort Worth	8	2	2		4	0	0	7
Galveston	0	14	0		0	3	0	3
Houston	1	4	1		0	3	0	5
San Antonio	3	3	1		4	4	0	10
MOUNTAIN								
Montana:								
Billings	5	1	0		0	0	0	1
Great Falls	30	0	0		0	0	0	2
Helena	0	0	0	3	0	0	0	0
Missoula	1	0	0	5	0	1	0	0
Idaho:								
Boise	3	0	1		0	0	0	0
Colorado:								
Denver	86	8	3		1	17	29	12
Pueblo	0	0	0		0	78	2	3
New Mexico:								
Albuquerque	10	0	1	1	1	2	0	0
Arizona:								
Phoenix	0	1	1		0	0	0	4
Utah:								
Salt Lake City	8	2	0		1	1	14	2
Nevada:								
Reno	0	0	0		0	0	0	2
PACIFIC								
Washington:								
Seattle	43	2	2			4	35	
Spokane	8	2	0			9	0	
Tacoma	11	1	3		1	0	0	1
Oregon:								
Portland	19	7	2	3	0	33	15	9
Salem	1	0	1			7	11	
California:								
Los Angeles	95	35	20	44	4	212	21	14
Sacramento	16	1	3	3	1	1	7	5
San Francisco	80	15	1	20	2	29	10	5

City reports for week ended April 11, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	3	10	0	0	0	2	0	1	0	18	29
New Hampshire:											
Concord	1	0	0	0	0	0	0	0	0	0	17
Vermont:											
Barre	0	0	0	0	0	2	0	0	0	1	7
Burlington	0	0	0	0	0	0	0	0	0	7	8
Massachusetts:											
Boston	85	89	0	0	0	5	1	0	0	24	223
Fall River	4	------	0	------	------	------	0	------	------	------	------
Springfield	10	17	0	0	0	2	0	0	0	2	32
Worcester	9	22	0	0	0	0	0	0	0	14	60
Rhode Island:											
Pawtucket	3	15	0	0	0	0	0	0	0	2	16
Providence	13	24	0	0	0	1	0	0	0	3	67
Connecticut:											
Bridgeport	10	6	0	0	0	0	0	0	0	1	35
Hartford	5	2	0	0	0	3	0	0	0	1	48
New Haven	9	0	0	0	0	2	0	0	0	6	52
MIDDLE ATLANTIC											
New York:											
Buffalo	29	18	0	3	0	8	0	0	0	23	160
New York	347	525	0	0	0	128	9	6	0	170	1,616
Rochester	11	85	0	0	0	1	0	3	0	8	84
Syracuse	12	22	0	0	0	1	0	0	0	13	48
New Jersey:											
Camden	6	4	0	0	0	0	0	0	0	0	38
Newark	35	51	0	0	0	12	0	1	0	27	126
Trenton	4	11	0	0	0	0	0	1	0	1	44
Pennsylvania:											
Philadelphia	105	152	0	0	0	40	1	1	0	43	613
Pittsburgh	30	55	0	0	0	6	0	0	0	35	225
Reading	5	1	0	0	0	0	0	0	0	0	13
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	21	31	1	1	0	13	0	0	0	1	169
Cleveland	37	60	0	0	0	19	0	0	0	28	223
Columbus	11	15	1	0	0	7	0	1	0	1	89
Toledo	15	9	1	0	0	7	0	0	0	8	72
Indiana:											
Fort Wayne	5	1	1	0	0	3	0	1	0	0	35
Indianapolis	9	40	8	8	0	9	0	0	1	57	------
South Bend	4	1	1	0	0	2	0	0	0	15	17
Terre Haute	2	1	0	0	0	0	0	0	0	0	15
Illinois:											
Chicago	128	232	2	1	0	38	1	2	0	49	763
Springfield	2	6	0	0	0	0	0	0	0	0	18
Michigan:											
Detroit	113	106	1	0	0	[illegible]	1	1	0	78	296
Flint	13	18	1	0	0	1	0	0	0	12	20
Grand Rapids	10	12	1	0	0	0	1	0	0	8	31
Wisconsin:											
Kenosha	2	1	0	0	0	0	0	0	0	0	6
Madison	2	0	1	------	------	------	0	0	------	1	------
Milwaukee	28	16	0	0	0	6	1	0	0	11	109
Racine	4	7	0	0	0	0	0	0	0	12	13
Superior	4	0	0	0	0	0	0	0	0	0	10
WEST NORTH CENTRAL											
Minnesota:											
Duluth	8	0	0	0	0	1	0	0	0	6	33
Minneapolis	40	17	0	6	0	3	0	0	0	29	106
St. Paul	32	11	0	0	0	1	0	0	0	16	57
Iowa:											
Davenport	2	1	1	10	------	------	0	0	------	0	------
Des Moines	10	7	2	17	------	------	0	0	------	0	26
Sioux City	2	0	1	------	------	------	1	------	------	------	------
Waterloo	2	1	1	0	------	------	0	0	------	8	------

City reports for week ended April 11, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST NORTH CENTRAL—contd.											
Missouri:											
Kansas City	25	8	2	0	0	6	0	0	0	12	108
St. Joseph	3	10	0	0	0	0	0	0	0	1	34
St. Louis	34	200	2	3	0	14	1	0	0	17	261
North Dakota:											
Fargo	1	4	0	0	0	0	0	0	0	3	8
Grand Forks	1	0	0	0			0	0		0	
South Dakota:											
Aberdeen	0	0	1	0			0	0		0	
Nebraska:											
Omaha	3	7	3	14	0	2	0	0	0	8	51
Kansas:											
Topeka	4	1	0	0	0	0	0	0	0	1	5
Wichita	5	2	2	27	0	1	0	0	0	3	35
SOUTH ATLANTIC											
Delaware:											
Wilmington	6	19	0	0	0	1	0	0	0	2	46
Maryland:											
Baltimore	36	38	0	0	0	14	2	4	1	11	249
Cumberland	0	0	0	0	0	0	0	0	0	0	14
Frederick	0	1	0	0	0	0	0	0	0	0	5
District of Col.:											
Washington	24	20	0	0	0	12	0	1	1	6	177
Virginia:											
Lynchburg	0	0	0	0	0	2	0	1	0	2	11
Norfolk	1	2	0	0	0	2	0	0	0	5	
Richmond	3	4	0	0	0	3	0	0	0	0	59
Roanoke	1	4	1	0	0	0	0	0	0	0	18
West Virginia:											
Charleston	1	2	0	0	0	1	1	0	0	0	14
Wheeling	2	0	0	0	0	2	0	0	0	0	18
North Carolina:											
Raleigh	0	2	0	0	0	0	0	0	0	13	13
Wilmington	0	0	0	0	0	0	0	1	0	8	13
Winston-Salem	1	0	1	0	0	1	0	0	0	3	14
South Carolina:											
Charleston	0	1	0	0	0	1	0	0	0	0	32
Columbia	0	0	0	0	0	1	0	0	0	0	19
Greenville	0	0	0	0	0	0	0	0	0	3	
Georgia:											
Atlanta	5	89	2	9	0	4	1	0	1	6	83
Brunswick	0	0	0	0	0	0	0	0	0	0	6
Savannah	0	0	0	0	0	0	0	0	0	0	20
Florida:											
Miami	0	0	0	0	0	4	0	1	0	0	35
St. Petersburg	0		0		0	0	0		0		5
Tampa	0	0	0	0	0	1	1	1	1	0	27
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	6	0	0	0	2	0	0	0	0	22
Tennessee:											
Memphis	9	64	2	0	0	7	0	0	0	0	79
Nashville	2	2	1	0	0	1	0	1	0	2	55
Alabama:											
Birmingham	2	7	0	0	0	9	0	0	0	3	82
Mobile	1	0	0	0	0	2	1	0	0	0	22
Montgomery	0	1	0	0			0	0		0	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	0	0	0			0	0		2	
Little Rock	1	9	0	0	0	0	0	0	0	0	
Louisiana:											
New Orleans	8	13	0	20	1	13	2	1	0	2	100
Shreveport	0	0	0	0	0	1	0	0	0	0	40

City reports for week ended April 11, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL—contd.											
Oklahoma:											
Muskogee	0	0	2	0			0	0		0	
Tulsa	3	0	0	5			0	0		1	
Texas:											
Dallas	5	2	2	1	0	3	0	0	0	22	66
Fort Worth	2	1	4	5	0	3	0	0	0	0	46
Galveston	0	0	0	0	0	0	0	0	0	0	14
Houston	2	5	1	3	0	2	1	0	1	0	61
San Antonio	1	2	0	0	0	3	1	0	0	0	60
MOUNTAIN											
Montana:											
Billings	0	1	0	1	0	0	0	0	0	4	6
Great Falls	1	0	0	0	0		0	0	0	11	10
Helena	0	1	0	0	0	0	0	0	0	0	6
Missoula	1	0	0	0	0	0	0	0	0	0	4
Idaho:											
Boise	0	0	1	0	0	0	0	0	0	0	7
Colorado:											
Denver	12	13	0	1	0	3	0	0	0	29	85
Pueblo	0	1	0	0	0	0	0	0	0	21	13
New Mexico:											
Albuquerque	1	0	0	0	0	5	0	0	0	0	12
Arizona:											
Phoenix	1	0	0	1	0	3	0	0	0	1	
Utah:											
Salt Lake City	2	4	1	0	0	4	0	0	0	41	46
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	6
PACIFIC											
Washington:											
Seattle	9	6	2	1			0	0		72	
Spokane	6	3	8	17			0	0		9	
Tacoma	3	1	4	2	0	0	0	0	0	0	26
Oregon:											
Portland	5	0	10	6	0	1	0	0	0	0	60
Salem	0	1	1	0			0	0		0	
California:											
Los Angeles	37	34	4	3	0	23	1	1	0	34	288
Sacramento	3	2	0	0	0	4	0	2	1	0	35
San Francisco	23	7	1	4	0	6	1	1	0	40	146

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Massachusetts:									
Boston	0	0	0	0	1	0	[illegible]	0	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	1	0	0	0	0	0	0	0
New York	8	5	4	2	0	0	1	3	0
New Jersey:									
Newark	1	1	0	0	0	0	0	0	0
Trenton	0	0	1	1	0	0	0	0	0
Pennsylvania:									
Philadelphia [1]	3	1	1	0	0	0	0	2	1
Pittsburgh	6	1	0	0	0	0	0	0	1

[1] Rabies (in man); 1 death at Philadelphia, Pa.

City reports for week ended April 11, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	2	2	0	0	0	0	0	0	0
Cleveland	0	0	0	1	0	0	0	0	0
Toledo	0	0	0	0	0	0	0	1	0
Indiana:									
Fort Wayne	1	1	0	0	0	0	0	0	0
Indianapolis	7	3	0	0	0	0	0	0	0
Illinois:									
Chicago	21	12	0	0	0	0	0	1	1
Michigan.									
Detroit	7	0	0	0	0	0	0	1	0
Wisconsin:									
Madison	1	0	0	0	0	0	0	0	0
Milwaukee	3	2	0	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	0	1	0	0	0	0	0	0	0
St. Paul	1	1	0	0	0	0	0	0	0
Missouri:									
St. Louis	11	5	0	0	0	0	0	0	0
Nebraska:									
Omaha	1	0	0	0	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	2	1	0	1	0	0	0	0	0
District of Columbia:									
Washington	0	0	1	1	0	0	0	0	0
South Carolina:									
Charleston	0	0	0	0	1	1	0	0	0
Columbia	1	1	0	0	0	0	0	0	0
Georgia:									
Atlanta	0	1	0	0	0	0	0	0	0
Savannah [3]	0	0	0	0	0	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	0	3	0	0	0	3	0	0	0
Nashville	2	0	0	0	0	0	0	0	0
Alabama:									
Birmingham	3	2	0	0	0	2	0	0	0
Montgomery	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	2	2	0	0	0	1	0	0	0
Texas:									
Dallas	0	0	0	0	0	2	0	0	0
Galveston	0	0	0	0	0	2	0	0	0
MOUNTAIN									
Colorado:									
Pueblo	2	0	0	0	0	0	0	0	0
Arizona:									
Phoenix	2	1	0	0	0	0	0	0	0
Utah:									
Salt Lake	0	1	0	0	0	0	0	0	0
PACIFIC									
California:									
Los Angeles	0	4	0	0	0	0	0	0	0

[3] Typhus fever; 1 case at Savannah, Ga.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended April 11, 1931, compared with those for a like period ended April 12, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities March 8 to April 11, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar 22, 1930	Mar. 28, 1931	Mar 29, 1930	Apr. 4, 1931	Apr. 5, 1930	Apr. 11, 1931	Apr. 12, 1930
98 cities	65	101	65	97	78	82	[2] 53	79	[3] 65	93
New England	79	92	67	65	70	56	46	68	[4] 84	82
Middle Atlantic	67	94	64	97	63	80	48	74	59	92
East North Central	72	134	72	132	82	114	[5] 63	107	86	115
West North Central	63	110	73	74	103	64	42	52	[6] 65	89
South Atlantic	53	104	73	90	61	70	47	64	49	80
East South Central	35	21	23	36	76	48	29	30	17	6
West South Central	68	111	71	136	64	125	85	139	54	153
Mountain	26	26	17	88	87	44	[7] 46	25	35	79
Pacific	55	63	51	45	69	34	53	51	57	51

MEASLES CASE RATES

	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar 22, 1930	Mar. 28, 1931	Mar 29, 1930	Apr. 4, 1931	Apr. 5, 1930	Apr. 11, 1931	Apr. 12, 1930
98 cities	946	646	1,040	776	1,208	879	[2] 1,125	1,004	[3] 1,332	1,195
New England	1,346	743	1,527	1,030	1,479	1,117	1,106	1,449	[4] 1,582	1,562
Middle Atlantic	1,028	396	1,158	530	1,321	611	1,250	789	1,422	966
East North Central	583	471	559	538	723	654	[5] 736	799	831	904
West North Central	595	781	492	904	650	608	532	860	[6] 700	1,199
South Atlantic	2,753	481	3,442	617	3,879	697	3,808	867	4,546	1,067
East South Central	1,146	634	905	1,291	1,635	968	1,501	526	1,751	329
West South Central	37	617	51	547	47	784	88	731	68	721
Mountain	1,462	2,449	1,288	2,830	1,140	2,987	[7] 696	4,731	814	7,674
Pacific	356	1,881	394	1,800	519	2,184	358	2,008	499	2,059

SCARLET FEVER CASE RATES

	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar 22, 1930	Mar. 28, 1931	Mar 29, 1930	Apr. 4, 1931	Apr. 5, 1930	Apr. 11, 1931	Apr. 12, 1930
98 cities	375	337	388	316	402	308	[2] 371	301	[3] 359	320
New England	589	426	676	372	697	303	577	462	[4] 470	351
Middle Atlantic	389	327	362	294	454	299	404	243	413	281
East North Central	399	461	395	418	378	383	[5] 380	377	338	430
West North Central	518	308	589	335	580	306	585	271	[6] 514	399
South Atlantic	310	210	342	286	310	272	290	276	355	308
East South Central	477	96	483	179	559	233	396	143	465	132
West South Central	95	167	101	108	78	111	95	157	105	108
Mountain	400	379	305	352	209	458	[7] 137	238	174	336
Pacific	96	229	110	202	104	204	92	168	104	217

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931, and 1930, respectively.
[2] South Bend, Ind., and Great Falls, Mont., not included.
[3] Fall River, Mass., and Sioux City, Iowa, not included.
[4] Fall River, Mass., not included.
[5] South Bend, Ind., not included.
[6] Sioux City, Iowa, not included.
[7] Great Falls, Mont., not included.

Summary of weekly reports from cities March 8 to April 11, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

SMALLPOX CASE RATES

	Week ended—									
	Mar. 14, 1931	Mar. 15, 1930	Mar. 21, 1931	Mar. 22, 1930	Mar. 28 1931	Mar. 29, 1930	Apr. 4, 1931	Apr. 5, 1930	Apr. 11, 1931	Apr. 12, 1930
98 cities	10	25	21	24	17	22	[2] 13	23	[3] 20	29
New England	0	0	0	0	0	2	0	0	[4] 0	2
Middle Atlantic	0	0	0	0	0	0	0	0	1	0
East North Central	9	30	8	20	7	17	[5] 8	30	6	23
West North Central	132	70	130	97	99	99	78	87	[6] 99	149
South Atlantic	0	4	0	2	4	8	2	2	18	10
East South Central	0	24	12	6	12	18	12	0	0	12
West South Central	61	24	95	49	78	45	71	17	81	28
Mountain	17	9	9	35	44	26	[7] 0	106	17	62
Pacific	41	115	43	103	22	71	16	71	53	89

TYPHOID FEVER CASE RATES

98 cities	3	6	4	8	4	8	[2] 4	4	[3] 5	5
New England	0	5	2	0	2	2	2	5	[4] 3	0
Middle Atlantic	2	5	2	6	2	15	3	3	5	1
East North Central	2	1	2	1	2	3	[5] 1	2	3	1
West North Central	0	4	8	10	2	4	4	2	[6] 0	4
South Atlantic	6	12	16	14	12	6	14	4	16	22
East South Central	17	24	0	84	0	30	0	30	6	18
West South Central	14	7	10	10	7	7	10	10	3	7
Mountain	0	53	0	18	0	0	[7] 9	18	0	44
Pacific	4	10	8	10	10	2	2	6	8	4

INFLUENZA DEATH RATES

91 cities	34	13	32	15	29	14	[2] 23	13	[4] 18	16
New England	36	2	19	2	14	10	2	7	[4] 20	7
Middle Atlantic	23	11	23	14	20	10	17	14	12	20
East North Central	28	9	28	9	25	11	[5] 18	10	14	8
West North Central	50	6	47	12	35	6	12	9	15	9
South Atlantic	57	18	49	28	32	16	39	8	30	26
East South Central	101	84	113	78	126	97	126	89	69	45
West South Central	55	43	35	25	55	32	69	86	45	25
Mountain	35	18	35	62	61	53	[7] 27	26	17	26
Pacific	36	2	34	7	41	2	14	0	19	12

PNEUMONIA DEATH RATES

91 cities	191	155	184	161	180	163	[2] 172	161	[4] 156	164
New England	147	169	183	218	156	220	127	181	[4] 175	186
Middle Atlantic	214	178	216	159	220	187	223	184	168	185
East North Central	139	127	132	148	125	117	[5] 121	146	118	127
West North Central	159	144	215	123	171	135	150	117	253	150
South Atlantic	332	196	269	222	263	212	221	196	199	230
East South Central	240	233	208	188	189	227	170	155	176	201
West South Central	206	142	180	199	211	164	238	164	169	181
Mountain	235	123	122	194	131	176	[7] 165	185	191	185
Pacific	125	65	101	77	98	92	53	62	60	72

[2] South Bend, Ind., and Great Falls, Mont., not included.
[3] Fall River, Mass., and Sioux City, Iowa, not included.
[4] Fall River, Mass., not included.
[5] South Bend, Ind., not included.
[6] Sioux City, Iowa, not included.
[7] Great Falls, Mont., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended April 4, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended April 4, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia		6			
New Brunswick					2
Quebec	1				15
Ontario		11		1	5
Manitoba			1		2
Alberta [1]					
British Columbia					2
Total	1	17	1	1	26

[1] No case of any disease included in the table was reported during the week.

Ontario—Communicable diseases—Four weeks ended March 28, 1931.—During the four weeks ended March 28, 1931, and the corresponding period of 1930, certain communicable diseases were reported in the Province of Ontario, Canada, as follows:

Disease	4 weeks, 1931		4 weeks, 1930	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis	5		10	4
Chancroid	1		7	1
Chicken pox	972		1,180	
Diphtheria	130	5	246	6
Dysentery				1
Erysipelas			1	
German measles	67		621	
Goiter			1	1
Gonorrhea	145		203	
Influenza	105	35	74	7
Lethargic encephalitis		2	5	4
Measles	278		4,412	1
Mumps	721		230	
Paratyphoid fever	11			
Pneumonia		275		230
Poliomyelitis	1			
Puerperal septicemia		1	3	2
Scarlet fever	766	2	1,432	5
Septic sore throat	11		28	
Smallpox	16		149	
Syphilis	153	1	184	
Tuberculosis	135	72	133	84
Typhoid fever	21	3	55	2
Undulant fever	10		7	
Whooping cough	316	5	309	1

The cases of smallpox were distributed as follows Toronto, 5, Thurlow, 2; and 1 case each in Chelmsford, Tyendaga, Ramsey Township, Burwash, Kingston, Kin, Cobden, Ottawa, and Hamilton.

Quebec Province—Communicable diseases—Week ended April 11, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended April 11, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Measles	463
Chicken pox	105	Mumps	14
Diphtheria	43	Scarlet fever	53
Erysipelas	5	Tuberculosis	26
German measles	4	Typhoid fever	13
Influenza	2	Whooping cough	21

CZECHOSLOVAKIA

Communicable diseases—February, 1931.—During the month of February, 1931, certain communicable diseases were reported in the Republic of Czechoslovakia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	2		Puerperal fever	45	18
Cerebrospinal meningitis	20	10	Scarlet fever	937	39
Diphtheria	1,441	122	Trachoma	146	
Dysentery	1		Typhoid fever	280	27
Paratyphoid fever	6		Typhus fever	25	3

MEXICO

Tampico—Communicable diseases—March, 1931.—During the month of March, 1931, certain communicable diseases were reported in Tampico, Mexico, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	1		Measles	1	
Diphtheria	2	1	Tuberculosis		33
Enteritis (various)		20	Typhoid fever	2	3
Influenza	71	6	Whooping cough	7	2
Malaria	146	8			

VIRGIN ISLANDS

Communicable diseases—March, 1931.—During the month of March, 1931, cases of certain communicable diseases were reported in the Virgin Islands as follows:

St. Thomas and St. John:	Cases	St. Croix:	Cases
Chicken pox	2	Chicken pox	2
Gonorrhea	2	Gonorrhea	1
Syphilis	3	Tuberculosis	3
Tuberculosis	3		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Oct. 19-Nov. 15, 1930	Nov. 16-Dec. 13, 1930	Dec. 14, 1930-Jan. 10, 1931	Week ended— January, 1931			February, 1931				March, 1931				April, 1931		
					17	24	31	7	14	21	28	7	14	21	28	4	11	18
Ceylon: Colombo	C												1					
China:																		
Canton	C	1															1	
Shanghai	C	2																
India	C	18,944	11,112	10,687	3,504	4,022	4,275	3,533	3,529	2,549								
	D	9,782	5,923	5,689	1,770	2,165	2,231	1,957	1,546	1,325								
Bombay	C	19	13		20	1										1		
	D	17	7		6	3												
Calcutta	C	33	22	28	36	29	24	32	27	33	45	65	80	102	129	125		
	D	16	16	20	25	19	19	23	22	25	26	39	49	68	69	70		
Karikal	C			1					4		1	4	2	1		2		
	D								4			4	2	1		2		
Madras	C	1		201	47	36	16		18	20	19	15	4		7	4		
	D			67	21	11	7	8	5	4	14	6	5		2			
Negapatam	D						1	2	1		2							
Rangoon	C			1														
	D			1	1													
Tuticorin	C	1	5	1	1					1								
	D	1																
India (French):																		
Chandernagor	C	1	1	2			1			1	2	2	2	2	2			
	D			3			1			1	3	1	2	3	1			
Pondicherry	C	1	4	31	9	4	3	3	10	20	31	39	29	25	26	20	5	
	D		4	21	3	3	3	2	10	9	6	9	6	5	4	3	1	
India (Portuguese)	C	14		1														
	D	9																
Indo-China (see also table below):																		
Pnompenh	C	1	2			1	2	1		3	3	3					1	
	D		2		•		2			1	2	2		1				
Saigon and Cholon	C	1	3	9	4	1		1			3	1	1		1	3	2	
	D		1	4	2	1					3	1	2	1	1	1		
Philippine Islands: [1]																		
Ports—Iloilo	C		1	1			2											
	D		3	1			2											

[1] Figures for cholera in the Philippine Islands are subject to correction.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931			February, 1931				March, 1931				April, 1931		
					17	24	31	7	14	21	28	7	14	21	28	4	11	18
Philippine Islands—Continued.																		
Provinces—																		
Capiz	C						3	56	69	54	28	35	29	11	4	4		3
	D						2	45	55	39	23	29	24	10	4	3		3
Iloilo	C	30	45	28	11	41	36	57	27	42	10	16	2	5				
	D	23	27	22	9	27	25	49	21	22	11	11	2	2				
Masbate	C												21					
	D												9					
Negros, Occidental	C	56	163	120	19	32	33	6	1	1	2							
	D	41	123	97	15	17	19	5	1	1	2							
Negros, Oriental	C							1										
	D							1										
Samar	C	16	8	17														
	D	12	8	9														
Sorsogon	C	5																
	D	4																
Siam	C	4	6	2	2		1			1				4	4	2		
	D	4	6	2	1									1	1			
Ayudhaya District	C															1		
Bangkok	C	3	4	2	2		1		1			1		1	1		1	
	D	2	4	2	1							1		1	1			
Bismulok Province	C													4	4			
	D													1	1			

Place		August, 1930	September, 1930	October, 1930	November, 1930			December, 1930			January, 1931			February, 1931	
					1–10	11–20	21–30	1–10	11–20	21–31	1–10	11–20	21–31	1–10	11–20
Indo-China (French) (see also table above):															
Annam [1]	C	3													
Cambodia [1]	C	59	38	22	8	1	17	28			7	19	36		35
Cochin-China [1]	C	27	33	26	5	5	3	8			7	4	13		5

[1] Reports incomplete.

PLAGUE

[C indicates cases, D, deaths; P, present]

Place		Sept 21–Oct 18, 1930	Oct 19–Nov 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan 10, 1931	Week ended— January, 1931 17	24	31	February, 1931 7	14	21	28	March, 1931 7	14	21	28	April, 1931 4	11
Algeria:																		
Algiers	C	6	11	2	1	1		1		1							1	
	D		3														1	
Bone	C							1										
Constantine, vicinity of	C		1		50			1		1								
	D							1										
Oran	C	10	2															
	D	3	1															
Plague-infected rats		6	1															
Philippeville	C	3	2		1													
	D	1			1													
Argentina:																		
Cordoba Province	C						1				2							
Entre Rios Province—Diamante	C											2						
Jujuy Province—Palpala	C							1			1							
Santa Fe	C										2							
Belgian Congo	C		1	1											2			
	D		1	1											2			
British East Africa (see also table below):																		
Tanganyika	C			3	2							15	7					
	D			3	2							4						
Uganda	C	165	171	111	67	7	8	2	8	6	4							
	D	164	168	112	67	6	8	2	8	6	4							
Ceylon: Colombo	C	3	1	9	9	1	1	1	5	6	2	1	2	1	3	3		1
	D	3	1	8	9		1	1	4	7	2	1	3	1	3	2		1
Plague-infected rats			1	2				1	1	1	1	1			8	1		
China:																		
Manchuria—Tungliau and Nungan	C	1																
Shensi	C		1															
Dutch East Indies:																		
Batavia and West Java	C	107	143	208	239	56	57	37	30	29	36	46	30					
	D	103	146	206	238	54	53	37	24	29	35	46	28					
East Java and Madura	C								4									
	D								4									
Java and Madura	D	335	501	557	615	142	102	98	85	89	100	99	80	65	81			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931: 17	24	31	February, 1931: 7	14	21	28	March, 1931: 7	14	21	28	April, 1931: 4	11
Egypt:																		
Alexandria	C	9	7	4	3				1	1			1	1				
	D	6	7	1														
Plague-infected rats				3	1		1				1							
Assiout	C		3	9	7	2	19	2	3	9		17	15	6	10	1	1	5
	D		1	1	1	2	2	2		4		3	4		4	1	1	
Aswan	C			3														
Beni-Suef	C					1												
	D					1												
Cairo	C																1	
Deirout	C						19	2		6	10							
	D						2	2			4							
Gharbieh	C							1										
	D							1										
Girga	C				7				1						14	37	35	31
	D				2				1						2	5	17	13
Kena	C															5		
	D															2		
Manfalut	C				21	5	21	4		11		2	2	3	5	9		
	D				5	2	3	1		4		1			2	1		
Minieh	C			1			1	1							2	1		
	D							1							1	1		
Port Said	C		2															
France: Marseille	C	4	4															
Greece (see also table below): Pyrgos	C	2																
India	C	2,371	2,721	3,259	3,740	1,169	1,279	1,438	1,449	1,270	1,095							
	D	1,068	1,497	1,856	2,226	837	737	957	891	862	774							
Bassein	C		1		2	1		1	2				1					
	D				1	1			2	1								
Bombay	C	2	1				1			1				1	1	1	1	
	D	2	1				1			1					2	1		
Plague-infected rats		64	30	32	38	10	6	9	9	14		8	10	17	14	21	18	

Madras Presidency	C	196	185	148	220	73	99	75	65	30	19	13						
	D	110	124	78	154	47	53	39	43	17	18	7						
Rangoon	C	2	2		2		2									1		
	D	2	1		1		1									1		
Plague-infected rats		1	1	4	2	2	1	1			8							1
India (Portuguese)	C		3															
	D		3															
Indo-China (see also table below):																		
Phnompenh	C	2		6	1	1	3	2	1				1					
	D	3	1	6	1	1	3	2	1		1	2	1	2	1	1		
Saigon and Cholon	C	1																
Iraq: Baghdad	C	1	P	4			2	3				1	2	1	3	3	1	
	D	1		2			2	2					2		3	1	1	
Madagascar (see also table below): Tamatave	C	1	5	4	2		5	4										
	D	1	3	3														
Morocco	C		5		19	13												
	D				8	4												
Nigeria: Lagos	C	5	38	9	5				1									
	D	5	7	9	5				1									
Plague-infected rats		11	13	5	5													
Peru (see table below).																		
Senegal (see table below).																		
Siam	C	1	6						4	5	9	3	1	2	2			
	D		5						2	4	6	4		1	1			
Bangkok	C		1	1	3		4	4		1	2	3		29				
	D		1	1	3		4	3	1		1	4		6				
Nagara Rajsima	C	1	1	11	17	3	2	1	3	7						1		
	D	1	1	9	10	2	3	1	4	6								
Syria: Beirut	C		6		1				1		1							
Tripolitania	C		1	13		2	2	1	3		1			1				
	D			1		2			1									
Tunisia: Tunis	C		1	P	13	1					9	2	3		5			
	D										7							
Union of Socialist Soviet Republics																		
Gouranduz	D							28										
Transcaucasia—Karabakh	C						6											
Union of South Africa																		
Cape Province	C		1	P														
Orange Free State	C				2				P	P	1	P						
	D				2						1							
On vessel: S. S. Marionga de Thermiotis at Avonmouth	C				1													

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931
British East Africa (see also table above):							
Kenya	C	87	53	58	62	50	69
Greece (see also table above)	C	-------	-------	2	-------	-------	-------
Indo-China (see also table above)	C	2	5	2	5	1	-------
Madagascar (see also table above):							
Ambositra Province	C	-------	-------	4	44	95	100
	D	-------	-------	4	44	87	96
Antisirabe Province	C	11	21	3	18	27	66
	D	11	21	3	18	26	57
Miarinarivo Province	C	2	7	18	12	18	28
	D	2	7	15	12	18	26
Moramanga Province	C	27	18	20	19	13	7
	D	27	17	20	19	11	5
Tananarive Province	C	39	79	125	170	178	92
	D	38	79	116	164	172	89

Place		Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931
Peru	C	21	10	42	34	8	-------
	D	8	2	20	14	-------	-------
Senegal:							
Baol [1]	C	79	48	53	-------	-------	-------
	D	20	23	35	4	-------	-------
Dakar [1]	C	108	3	-------	-------	-------	-------
	D	90	8	-------	-------	-------	-------
Louga [1]	C	75	61	37	10	-------	-------
	D	33	30	25	3	-------	-------
Thies [1]	C	34	12	24	27	2	-------
	D	20	4	15	23	1	-------
Tivaouane [1]	C	110	20	53	31	2	-------
	D	54	14	31	25	1	-------

[1] Reports incomplete.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931			February, 1931				March, 1931				April, 1931	
						17	24	31	7	14	21	28	7	14	21	28	4	11
Algeria:																		
Algiers	C				1				1		1					2		
Bone	C							1										
Constantine	C		1												1			
Oran	C			3														
Arabia: Aden	C								1	1								
Belgian Congo	C				79	27	23											
Belgium	C									1								
Brazil:																		
Porto Alegre (alastrim)	C	26	28	36			3			1	1	2	3					
Rio de Janeiro	C		2															
British East Africa (see also table below): Tanganyika	C	95	17	385	84	21	25	18	6	35	42	13	1					
	D	6	1	30	4	1	1	2	1		12	1						
British South Africa: Southern Rhodesia	C	153	95	18	18	2	1											
	D			3														
Canada:																		
Alberta	C	22		1	19		7			1								
British Columbia—Vancouver	C	2	3	1	3				2	1	2	5						
Manitoba	C							1				1						
Winnipeg	C				1							1						
Nova Scotia	C							1								1		
Ontario	C	19	59	23	17	10	3	32	4	10	4	7	8	2	3	3	1	
Kingston	C				6	1					1							
North Bay	C				2					1								
Ottawa	C		37	12	2	1	1	1			1							
Sault Ste. Marie	C				1	11	8	5	6			2						
Toronto	C			4										1		1		3
Quebec	C			2			2											
Saskatchewan	C	3	2	18		7	6	5	20	17	18	18	10	40	10	8		
Regina	C										1					2		
Canary Islands: Las Palmas	C															1		
China:																		
Canton	C									2			1	1	2	2	2	
Chungking	C	P	P	P	2													
Foochow	C	P	P	P	P		P		P		P		P					
Hong Kong	C				1		1			2	5		2			1	1	
	D									1	1	1				2		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov 15, 1930	Nov. 16–Dec 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931 17	24	31	February, 1931 7	14	21	28	March, 1931 7	14	21	28	April, 1931 4	11
China—Continued.																		
Manchuria—																		
Harbin	C		1					1				1						
Kwantung—Dairen	C			4	1											2		
	D			1														
Nanking	C	P	P	P	P	P		P	P	P	P	P	P					
Shanghai—																		
Foreigners only	C	1	2	8	14	1	1	6	4	4	7	2	3	3	1	1	1	
Including natives	D		1	4	11	2	4	4	3	5	2	4	3	5	2	2	1	
Swatow	D	4	3	3	5	1	1	3	2		3	3	7	3	6	9		
Tientsin	C	1	1	2		1												
Chosen (see table below).																		
Colombia. Cali	D	2		1														
Dutch East Indies																		
Java—Batavia and West Java	C	14	26	6	4		28		1					1				
	D	4	4	2	2		1		1	1								
Sanggi Islands	C		29															
	D		3															
France (see table below).																		
Great Britain:																		
England and Wales	C	325	372	508	665	187	272	286	213	221	50	247	227	171	219	226		
Bradford	C	1	1	1	1		1		3		1				1			
Cardiff	C	1																
Leeds	C	1	2		2												1	
London	C	29	172	184	161	45	47	33	24	23	16	23	36	26	54	32		
London and Great Towns	C	52	296	433	560	154	198	194	147	150	136	189	158	117	154	166		
	D		1	1							1							
Sheffield	C						1	1	1		16	6	10	2	1	6		
Stoke-on-Trent	C		1				1						1					
Greece (see table below).																		
Honduras:																		
Amapala	C												1					
Ocotepeque and Gracias districts	C												P					
Puerto Castilla	C				4	7	1		3	3								
Tela	C																	1

India	C	2,322	2,412	3,627	5,623	2,068	2,396	2,477	2,682	2,996	2,766							
	D	572	606	874	1,381	497	486	523	739	665	620							
Bombay	C	1		1	2	2	2	2	1		1	3	2	4	1	4	1	
	D			1	2			1			1	1	1		1	2	1	
Calcutta	C	12	9	18	59	28	28	40	47	35	51	83	82	53	69	75	86	
	D	11	7	11	40	16	22	29	33	26	41	66	55	36	54	50	63	
Cochin	C	12	25	22	15	5	6	8	10	19		16	24	15	17	14		
	D	1	3	4	1					1		1	1					
Karachi	C			3				2	1			4			3			
	D			1				1	1							2		
Madras	C	19	9	20	4	4	7	8	2	4	1	3	1	6	3	9	4	
	D	8	2	3							1				2	1		
Moulmein	C						2											
Negapatam	C	14	9	6														
Rangoon	C	2	1	1						2		1	1	1	1	1		
	D		1											1				
Tuticorin	C	1																
Vizagapatam	C	1							1			8		1		1		
	D											2				1		
India (French)																		
Chandernagor	C	3	3		5	3	2	1	3	2		6	6	3	3	6		
	D	1	1		3	1						1						
Karikal	C	1			3	1	2		2	2		16	1			1		
	D	1			2		2		2	2		16						
Pondicherry Province	C	38	11	19	34	16	8	13	8	1	1	10	7	7		4		3
	D	30	11	17	32	16	8	13	8	1	1	10	7	7		4		3
India (Portuguese)	C				4	1	4			2	3	6	3					
	D									2		1						
Indo-China (see also table below):																		
Pnompenh	C	2		1	2				1					1				
	D			1					1									
Saigon and Cholon	C		2	2		3	1		2		2	2		1		1		1
	D		2	2		2			2			1		3	1	2	2	1
Iraq:																		
Baghdad	C	2										3	6					
Mosul Liwa	C	69	6	16	1		2		1		5							
	D	27		2							1							
Ivory Coast (see table below)																		
Japan																		
Kobe	C											1	1					
Taiwan	C								1									
Mexico (see also table below)																		
Jalisco (State)—Guadalajara	D	3	3	3			1									1		
Juarez	D	1	1															
Mexico City and surrounding territory	C	13	9	6	10					7	5		11	13	13			
	D	3	2	6	6				1	1	3	2	2	5	5			
Vera Cruz	C		1							1		1	1		1	1		
Morocco (see table below).																		
Nicaragua: Porto Cabezas	C				2													
Nigeria: Lagos	C															2		
Panama Canal Zone	C							2										
Poland	C		8	3	25						1							
Portugal: Lisbon	C	16	20	37	72	27	31	15	30		12	19	9	16	15	17		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931			February, 1931				March, 1931				April, 1931	
						17	24	31	7	14	21	28	7	14	21	28	4	11
Siam	C	1			1	1	1	1	1	1	1							
Somaliland, British: Boales	C	1	1	1														
	D	1			1													
Spain	C		51	67	68			10	8	10	4	10	46	45	15	21	22	
Straits Settlements	C	5	10	17	6	3	1	2	1			2				2	1	
	D	1	2	7	3			1				1				1		
Sudan (Anglo-Egyptian)	C	82	5	50	64	1	7		3	1	1	44	51	3	1	4		
	D	7	1	5	6		7					6	4		1	1		
Sudan (French) (see table below).																		
Switzerland: Berne Canton	C	1																
Syria (see table below).																		
Tunisia: Tunis	C	2			17	6	1	1								4		
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P				P				P					
Orange Free State	C		2	P					P			P	P			P		
Transvaal	C	P	P	P	P	P	P	P	P	P	P	P	P					
Upper Volta	C			6	4						8	10				3		
	D				2											1		
On vessel:																		
S. S. Clan Mactoggart at Suez	C									2								
S. S. Muncaster Castle at Manila from Hong Kong	C				1													
S. S. Matheran at Suez from Calcutta	C						1											
S. S. Clan Buchanan at Suez	C											2						
S. S. Rotterdam at Naples from Venice	C															1		

Place		August, 1930	September, 1930	October, 1930	November, 1930			December, 1930			January, 1931			February, 1931	
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20
Indo-China (see also table above)	C	93	192	258		86		38	9	14		48	46		46
Ivory Coast	C			4		2		9							
Sudan (French)	C	39	P	17				43		96					
	D	3		2				16		4					
Syria: Beirut	C	1										1			

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
British East Africa (see also table above):							
Kenya	C	186		424		653	
Chosen	C	65	35	3	22		
	D	21	15	5	6		
France	C	1					
Greece	C	1	6				4
Mexico (see also table above)	D	659	718	822	893		1
Morocco	C	3	8	4	4	20	25
Turkey	C	51	21	19	74		
	D	13	4	2	1		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931: 17	24	31	February, 1931: 7	14	21	28	March, 1931: 7	14	21	28	April, 1931: 4	11
Algeria:																	
Algiers	C	1	2						1	1					3		
Constantine Department	C	1	2	6		6	6	19			4			1		2	
Oran	C		5			1	2					1					
Australia; western	C															1	
Bulgaria	C	3	11	3	9	2	1	1		2		3					
	D			1													
Chile: Valparaiso	D													1			
China:																	
Canton	C					2							1				
Manchuria—Harbin (see also table below)	C		1			3											
Shanghai	C					2											
Tientsin	C		1														
Chosen (see table below).																	
Czechoslovakia (see table below).																	
Egypt:																	
Alexandria	C	2	2														
	D	2															
Beheira Province	C			1													
	D			1													
Cairo	C		1	1				1									
Port Said	C	2				1											
Eritrea: Asmara	C												1				
Great Britain: Scotland	C							1									
Glasgow	C						2										
	D						1										
Guatemala.[1]																	
Iraq: Baghdad	C								2	1	1	1	1				
	D								1								
Latvia (see table below).																	
Lithuania (see table below).																	

Mexico (see also table below):																	
Durango	D						1										
Mexico City, including municipalities in Federal District	C	11	14	12	13	12	6	8	13	13	9		46	66			
	D	4	7	10	8	9	9	8	4	7	5		20	13			
San Luis Potosi	D		2						2	2		1	1	1	2	1	1
Morocco	C	3	1	8		5	6	2	7	8	5	8	2	2	3		
	D					2				1							
Palestine	C	3	7	4	1	1			3				2	1	1		1
Paraguay: Asuncion	D					2	2										
Poland	C	37	42	63	19	21	18	50	49	41	43	56	62	58	85	82	
	D		7	3	2	1	4	1	3	3	4	9	4		7	4	
Portugal: Oporto	C	4	6			1											
Rumania	C	41	34	113	54	43	51	45	49	53	12	38					
	D	2	3	5	1	7	6	2	5	11	3	5					
Spain	C	4	1														
	D		1														
Tunisia:																	
Sbeitla, vicinity of	C															20	
	D															7	
Sfax	C														2		
Tunis	C		28			7	4	5			6	12	5	2	7		
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P	P	P	P	P	P	P	P	P						
Municipality of East London	C	1	1	3		1	1	1									
Natal	C	P		P	P	P	P	P	P	P							
Orange Free State	C	P		P	P	P	P	P	P		P	P					
Transvaal	C	P	P	P	P	P	P	P	P	P	P	P					
Yugoslavia (see table below)																	

[1] On Feb 27, 1931, the Director General of Public Health of Guatemala reports an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths, P, present]

Place		Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931
China: Harbin (see also table above)	C	5		3			
Chosen: Seoul	C	2	1	7	1	1	1
Czechoslovakia	C	1			16	16	60
Greece: Athens	C	6	4	4	4	10	10
Latvia	C	1	2				
Lithuania	C	7	24	1	5	6	26
	D	1	2		1	3	3
Mexico (see also table above)	D	25	47	47			
Turkey	C	11		28	3	2	
Yugoslavia	C	2		2	2		20
	D	1		1			2

YELLOW FEVER

	Cases	Deaths
Brazil:		
Bahia State—Mar. 14, 1931	1	
Ceara State—Mar. 14, 1931	2	
Barbalha, Feb. 7, 1931	1	1
Minas Geraes State—		
Mar. 20, 1931	2	
Apr. 5–11, 1931	1	
Rio de Janeiro State—		
Mar. 7, 1931	1	1
Mar. 21, 1931	1	1
Brazil—Continued.		
Rio de Janeiro State—Continued.		
Cambucy—		
Jan. 1–25, 1931	3	3
Feb. 1–7, 1931	1	1
Friburgo (imported), Jan. 25–30, 1931	1	
Padua—		
Jan. 18–24, 1931	1	1
Feb. 1–7, 1931	1	1
Gold Coast:		
July 10, 1930	1	
Alboesso, Aug. 4, 1930		1

×

UNITED STATES TREASURY DEPARTMENT

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SPECIAL ARTICLES

Maintaining a Balanced Program in County Health Work

Selection of Dilution Waters for Oxygen Demand Tests

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, Chief of Division

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PUBLIC HEALTH REPORTS

VOL. 46 MAY 8, 1931 No. 19

CRITERIA FOR MAINTAINING BALANCE OF PROGRAM IN COUNTY HEALTH DEPARTMENTS[1]

By F. L. ROBERTS, M. D., *County Health Officer of Gibson County, Tenn.*

Many years ago Socrates was wont to tell the young men of Athens to define their terms. This injunction, though often neglected, is as good to-day as it was when Socrates lived and taught. A criterion may be defined as a standard by which a correct judgment can be formed. A standard, in turn, is defined as a concrete measure to which everything of the same kind must conform. Thus it is seen that criterion adds to standard the idea of judgment; it implies not so much the idea of conforming to as of meeting a test. This conception of criterion should be borne in mind throughout this discussion.

It will be admitted without argument that any county health department should have a balanced program; and as a corollary to this proposition it may be stated that the smaller the unit, the more necessary the balance. Granting that programs must have balance, the question confronting the health officer is how to secure and maintain this balance. In endeavoring to answer this question the experience in Gibson County will be used to a great extent. It may be that some of the methods used there are not applicable to other counties, but in general it is felt that these methods can be used in any county.

There are four factors which may serve as criteria for maintaining balance of program in county health departments. These are (1) definition of problems, (2) fitting of resources to problems, (3) use of the Appraisal Form, and (4) planned-work programs.

In defining problems confronting the health department, the communicable-disease problem holds first place. The primary function of a health department, the primary reason for its establishment and inclusion in the body politic, was and is the control of communicable disease. It is true that the scope of health work has widened, and rightly so; but this does not alter the fact that communicable-disease control is of paramount importance, and this problem should be clearly defined.

In Tennessee, tuberculosis is a major problem in every county. This problem can be brought more clearly into focus in a variety of

[1] Read before the Fourth Annual Conference of Tennessee State and Local Public Health Workers at Nashville, Tenn., Dec. 18-20, 1930.

ways. One of the best methods is by the tuberculin testing of school children. By following up the positive reactors a great deal of hitherto unknown tuberculosis can be found. With a limited personnel and a large school population it will be impossible to follow up all the reactors in any one year, but an effort should be made to test and follow up as many as possible. This procedure will serve several purposes. It will more clearly define the problem, it will serve as ammunition in securing increased local appropriations, and it is a means of educating and interesting the general public.

Another method for defining the tuberculosis problem is the use of the case-finding clinical service offered by the State department of public health. This activity should be integrated with the tuberculin-testing activities; that is, the leads developed by the tuberculin testing should be followed up, in so far as possible, by examination in the tuberculosis clinics.

Although these methods are more or less familiar to every health worker, it must be remembered that if the problem is going to be attacked efficiently it must be clearly focused, and tuberculosis looms large as a problem in communicable disease control.

Typhoid, diphtheria, and other communicable diseases should be attacked in the same way. The morbidity and mortality rates for several preceding years should be known, as well as the location of the cases and the age groups affected. It was by surveys and by studies of morbidity and mortality rates that the problem of diphtheria control was accurately defined. As a result of that work every health officer knows that diphtheria control should be directed to the preschool group.

Some communicable diseases are of such a nature that it is extremely difficult to get even an approximate idea of their prevalence. An example of this is venereal disease. Although knowledge is not complete, there is sufficient data to justify the statement that there is no other group of diseases so widespread and so devastating in their effects, not only on the present generation but on future generations. Thus, in the area of the United States in which syphilis has been reported since 1920, there have been 35,000 more cases of syphilis reported than of scarlet fever; 79,000 more than all forms of tuberculosis; 500,000, or nearly one-third, more cases of syphilis than of diphtheria; three times as much syphilis as smallpox; and five times as much syphilis as typhoid fever.

By examination of food handlers, by Wassermann tests on all people examined in the health department, and by securing the active cooperation of practicing physicians, an appalling number of cases of syphilis will be found in every county. If any health officer says that syphilis is not a problem in his county, it means that he has not looked for it. Most illuminating data can be uncovered if every case

that is found is followed up by an examination of other members of the family. Thus, in a group of 276 patients in active attendance at the clinics in Gibson County there were 168 primary examinees. By this is meant that there were 168 patients in this group who first came to the clinic. Of these 168 primary examinees, 92 were married. Of these 92, there were 77, or 86.6 per cent, who had contacts examined. There was a total of 108 contacts examined, or 1.4 per person.

What is true of communicable diseases is true of other problems. In child hygiene the health officer should have an accurate knowledge of maternal and infant deaths and the causes thereof. He should, too, know the number and causes of deaths of children under 5 years, and by his school examinations he can learn the quantity and quality of defects in school children. With this knowledge the health officer can better plan his campaign.

In the field of sanitation an accurate knowledge of conditions is fundamental to a program of control. The number and physical condition of food and milk handlers must be known, and the condition of private and municipal water supplies—in short the sanitary status of the county—must be determined before planning a program in sanitation.

The second criterion is the fitting of resources to problems. It is useless to hunt elephants with a sling shot. The major effort should be spent on major problems. For instance, a program of stocking ponds with top minnows in a county where there is no malaria would be wasted effort. The point is simply this: If malaria is your chief problem, then that problem should be attacked first. No one should advocate taking one problem and trying to solve it at the expense of every other activity; nor should one spread his efforts over so many activities that he accomplishes nothing. The larger part of one's time and effort should be spent on major problems, and other activities should be subordinated.

Such a plan is not always completely workable. Public opinion may demand certain activities that the health officer must perform in order to retain the public support. In this regard it should be remembered that there is a twofold object in health work: One is to do the health work proper, and the other is to carry out any legitimate project that will aid is selling the work to the people of the county. Sometimes this latter may be time-consuming, but it is necessary.

In fitting resources to problems, surveys are of inestimable value. These surveys have previously been mentioned with reference to defining problems. There is another benefit which may be derived from surveys, and that is that they aid in bringing the details of public health problems before the public, showing the needs of the community, and will often be the entering wedge for increased appropriations.

The third criterion is the use of the Appraisal Form of the American Public Health Association. It is pretty generally agreed that this form is the best method we have at present for securing a balanced program. Every health officer should take the Appraisal Form and appraise his own unit by the standards set forth there. It will do more to show the lack of balance in his program than almost any other method. In view of its importance it should be discussed in some detail. At the outset it should be remembered that it is not an appraisal of the health unit but of the community's health assets. For example, if two units, A and B, are doing exactly the same quantity and quality of work, and B's community has twice the population, then the appraisal of A's unit will be higher than B's, because indices are based largely on population. It should also be remembered that the score is not the essential thing but that the form should be used to show the ratio of activity or accomplishment to what group judgment states as desirable.

The record system in Tennessee is built around the Appraisal Form. This form takes up in detail vital statistics, communicable-disease control, venereal-disease control, tuberculosis control, child hygiene, sanitation, laboratory work, and public-health education. It is essentially a program of activities and services rendered. In order to have a balanced program, each of the above items must be considered.

Section A gives 60 points out of a thousand to vital statistics. To meet the requirements of this section, careful record keeping is essential. Regardless of size, any unit should get a high score on this item.

Careful record keeping is also an essential in section B, which deals with communicable-disease control and to which 175 points are allotted. A small unit can not possibly score extremely high on this item, but it will serve as an excellent criterion for maintaining balance of program if it is followed in so far as facilities permit.

Section C deals with venereal-disease control, and this is one of the most important activities in which a health department can engage, although, due to the scant attention given to it, only 50 points are allotted in the Appraisal Form. Venereal disease is an urgent problem in every county in every State. One should not be discouraged by a small start. In 1925 in Gibson County there were only 11 cases under treatment, and the unit would not have scored more than 2 points out of the possible 50. In 1929 Gibson County scored 38 points, and this with no increase of personnel. The increase in venereal-disease work came as a result of study of the problem of fitting of resources to the problem, and of an attempt to meet standards which the group judgment of the Appraisal Form has set up as necessary.

In order to secure very many points under section D, which is devoted to tuberculosis control, it is almost essential that a county have a fairly adequate force of nurses and some hospital facilities. Surveys in this field are necessary for building up public demand for increased facilities.

Section E is devoted to the health of the child. It starts with the prenatal care and carries the child through school. Prenatal service can be developed to an extremely high degree. Prior to March, 1930, practically no prenatal service was given in Gibson County. In January there were 6 new cases under supervision, in February 4 were added, in March 18, in April 69, in May 61, in June 53, in July 60, in August 21, in September 44, in October 44, and in November 35 were added, making a total of 415 new cases admitted up to December 1. This clearly demonstrates how one might have present in his county an unrecognized potentiality, easily made actual by a little change in emphasis, presentation, or perspective.

The Appraisal Form gives what group judgment deems desirable in the field of child health. It is a distinct aid in forming a judgment of one's work—in short, it answers the requirements for a criterion.

In looking over the quota of nursing visits in the field of communicable disease, tuberculosis, prenatal cases, infants, and school children, one's tendency is to be discouraged. But with the use of the family folder it is surprising how many visits one nurse can make. For example, she may go to visit a prenatal case, and in the same home there are two preschool children and two school children. And so at this one visit she may take up each child and get credit for a prenatal visit, two preschool visits, and two school visits. In many instances tuberculosis cases will have preschool or school children in the home. It is certain that by correct use of the family folder and careful record keeping a great many visits can be made, and, conversely, one can fail to make a good showing by the lack of a careful record of work done.

Section F deals with sanitation. It accounts for improvement of water supply, of excreta disposal, and of milk control. At this point the importance of physical examination of food handlers should be stressed. Until 1930 Gibson County never gave the subject much consideration, but during the past few months regular hours have been scheduled for the examination of food handlers. Up to November 15, 236 food handlers were examined—187 white and 49 colored. Of the 187 white persons, 2.6 per cent showed a positive Wassermann and 3.7 per cent showed a positive diphtheria culture. Among the 49 negroes, 16 per cent were found with positive Wassermann and 4 per cent with positive diphtheria cultures. All had negative stool and urine cultures for typhoid.

Section G takes up laboratory work and popular health education.

The fourth criterion is the use of a planned work program. Any health officer will find that his performance will increase in amount and efficiency when he follows a charted course. In Gibson County an attempt is made to chart a course each month. A proper schedule allows plenty of latitude for other work that might come up unexpectedly. What the schedule aims at is to accomplish certain definite things at certain definite times during the month. Such a plan will do away with a great deal of haphazard work. Without some such plan it is certain that a great deal of time and effort will be wasted.

Thus, a definition of public-health problems, a fitting of all available resources to these problems, the proper use of the Appraisal Form, and a planned work program built around these criteria will aid in working out a balanced program. In order to check up on the shaping of the program, the performance sheet is essential. It will aid the health officer in visualizing the progress of his program.

SUMMARY

A criterion implies the idea of meeting a test, and to meet the tests adequately balanced programs are essential. There are at least four criteria for maintaining balance of program, viz, the definition of problems, the fitting of resources to problems, the use of the Appraisal Form, and planned-work programs. The problems should be determined and the resources at hand fitted to these problems. The Appraisal Form will aid in distributing efforts to give attention to vital statistics, communicable-disease control, tuberculosis and venereal disease, prenatal, infant, preschool, and school hygiene, the problems of excreta disposal, pure milk and water supply, the physical condition of food handlers, laboratory work, and popular health education. Finally, a planned work program will aid in carrying out the proposed program.

EXPERIMENTAL STUDIES OF NATURAL PURIFICATION IN POLLUTED WATERS

V. THE SELECTION OF DILUTION WATERS FOR USE IN OXYGEN DEMAND TESTS

By Emery J. Theriault, *Chemist*, Paul D. McNamee, *Technical Assistant*, and Chester T. Butterfield, *Bacteriologist*, *United States Public Health Service*

Despite the numerous difficulties which surround the application of biochemical oxygen demand tests to the estimation of the "strength" of raw sewages, the "quality" of sewage effluents, or the "stability" of polluted waters, it is significant that, even in their present stage of development, the use of such tests has become widespread. While the improvement of these biochemical procedures has been primarily

of analytical import, no other class of sanitary chemical tests has proved more fruitful in the formulation of a rational theory of biological oxygenations as exemplified on a practical scale in modern sewage treatment.

At the present time the interest of several groups of workers has been centered on an attempt to effect a further degree of standardization in analytical procedures for the determination of the oxygen demand of polluted waters. In particular, considerable interest has been manifested in the production of a "standard" dilution water for use in such tests.[1]

In the present study of the effect of mineral salts on the rate and extent of biological oxygenations, the primary interest, therefore, has been to contribute toward the selection of a dilution water for general use in oxygen demand tests. In another direction, the effect of mineral salts is of considerable importance in investigations of self-purification in highly mineralized tidal waters and in waters heavily charged with industrial wastes of mineral origin. These studies also have a bearing on the question in sewage treatment regarding the relative effect of "hard" and "soft" waters as carriers of pollution.

Recommendations in the 1925 edition of Standard Methods of Water Analysis of the American Public Health Association are to the general effect that, for use in oxygen demand tests, a dilution water should be free from iron and should not contain more than 0.01 part per million of nitrogen as nitrate, nitrite, or free ammonia. The stipulation in regard to the allowable nitrogen content is so severe that, as pointed out by Mohlman, Edwards, and Swope (1928), "Few tap waters could meet these specifications and the inference is that distilled water would be suitable provided it is low in ammonia." Other recommendations regarding the selection of a suitable dilution water for use in oxygen demand tests have ranged from the advocacy by Theriault and Hommon (1918) of stored tap water to the proposal by Garner (1922) of "ammonia-free distilled water, prepared by distillation from acidified water."

More recently various synthetic waters have been proposed to simulate in greater or less degree the mineral salt content of natural waters. The composition and properties of these dilution waters

[1] The boards of engineers of the Great Lakes Drainage Basin and of the Ohio River have appointed a joint committee to formulate plans for cooperative research. The personnel of this committee is as follows:

Indiana: E. H. Parks.
Michigan: W. S. Sperry.
Minnesota: H. A. Whittaker.
New York: C. R. Cox.
Ohio: R. D. Scott.
Pennsylvania: F. E. Daniels.
Wisconsin: F. L. Warrick, *Chairman*.
United States Public Health Service: E. J. Theriault.

Extensive studies have been carried out by the Sanitary District of Chicago (F. W. Mohlman). The problem has also been considered by the Illinois State Water Survey (A. M. Buswell) and by the New Jersey State Department of Health (L. Forman).

will be briefly described in the following pages. It will next be shown that, in all probability, the specifications for a dilution water suitable for use in studies of nitrification as in sewage effluents (or in prolonged observations on the oxidation of raw sewage) would be far more rigid than in similar studies of the first or carbonaceous stage of deoxygenation. Limiting the discussion to the simpler case, numerous experiments will then be presented to show the effect of various mineral salts in different concentrations and at different pH values on the course and extent of the deoxygenation of raw sewage. It is believed that only with the accumulation of similar data by other interested organizations, working with other wastes, can further progress be made in the desired standardization of the oxygen demand test.

SYNTHETIC RIVER WATERS (FORMULA A)

In preliminary experiments on the effect of mineral salts on the deoxygenation of polluted waters, use was made of a dilution water which, on the basis of data kindly furnished by Dr. W. D. Collins, United States Geological Survey, is believed to be fairly representative of the average American river water, excluding certain western waters. The composition and method of preparation of this synthetic river water is given in Table 1. With the omission of silicates and of the trace of nitrates and manganese, this water corresponds very closely to a synthetic river water (Formula A) which we have used as an approximation to the "average" composition of Ohio River water at Cincinnati, Ohio.

TABLE 1.—*Composition of the "average" American river water*

Constituent	Composition		Chemical used	Milligrams of salt per liter
	Parts per million	Per cent		
Ca	36	21.1	CaO	50.40
CO_2	54	31.6	CO_2	39.60
Mg	10	5.8	$MgSO_4$	50.00
SO_4	40	23.4		
Na	10	5.8		
Cl	6	2.9	NaCl	7.91
SiO_3	12.8	7.5	Na_2SiO_3	18.82
K	2	1.2	K_2SiO_3	2.71
NO_3	1	.6	KNO_3	1.63
Fe	.1	.1	$FeCl_3$	.30
Mn	.01	Trace.	$MnSO_4$	.03
Total [1]	170.9	100.0		170.9

[1] Basis of solids at 180° C.

The theory in the use of this synthetic river water was that the ideal dilution water for stream pollution studies should be one in which the mineral constituents were approximately the same as those naturally present in the receiving body of water. The advantage in the use of

such a dilution water lies in the avoidance of troublesome corrections for organic matters generally present in river waters. This condition was fulfilled by Theriault and Hommon (1918) through the use of stored tap water (filtered river water) in studies of the Ohio River. A similar opinion is expressed in the recommendation of Cooper, Cooper, and Heward (1919) that the dilution water should be taken from the stream into which effluents are to be discharged.

FORMULAS B AND C DILUTION WATERS

It is obvious that, under ordinary field conditions, the more or less exact duplication of the mineral salt content of a given receiving body of water would frequently be impracticable. In simplification of Formula A, calcium chloride was accordingly substituted for calcium bicarbonate which had been prepared by passing carbon dioxide through a suspension of calcium hydroxide. The buffer strength of this modified dilution water (Formula B) is very low. In experiments designed to test its suitability for dilution purposes it was therefore considered advisable to buffer the solution by the addition of phosphates. As an abundant supply of sodium and potassium was thereby introduced, these ingredients were accordingly omitted from the original formula. The simplified solution, denoted as Formula C, then possessed the composition given in Table 2.

TABLE 2.—*Composition of Formula C dilution water*

Constituent	Milligrams per liter			Stock solutions of mineral salts	Grams of salt per liter of stock solution	Milliliters of stock solution per liter of dilution water		
	Quarter strength	Half strength	Full strength			Quarter strength	Half strength	Full strength
Ca	10.0	20.0	40.1	0.10 M $CaCl_2 \cdot 4H_2O$	18.3	2.5	5	10
Cl	17.7	35.4	70.9	do				
Mg	2.4	4.9	9.7	0.004 M $MgSO_4 \cdot 7H_2O$	9.9	2.5	5	10
SO_4	9.6	19.2	38.4	do				
Fe	0.01	0.03	0.06	0.001 M $FeCl_3 \cdot 6H_2O$	0.27	0.5	1	2
Total [1]	39.7	79.5	159.2					
KH_2PO_4, $KNaHPO_4$	47.4	94.7	189.4	Phosphate buffer	([2])	1.25	2.5	5
Total [3]	87.1	174.2	348.6					

[1] Exclusive of buffer salts.
[2] See text.
[3] Inclusive of buffer salts. For the calculation it was assumed that the constituents of the buffer solution are KH_2PO_4 and $KNaHPO_4$.

It will be noted that the total mineralization, inclusive of buffer salts, for the solutions denoted in Table 2 as "quarter strength," "half strength," and "full strength" is, respectively, 87, 174, and 348 parts per million. In respect to mineral-salt content these solutions may be regarded as roughly representative of soft, average, and hard waters.

The phosphate buffer solution specified in Table 2 is the Clark-Lubs KH_2PO_4–NaOH mixture. As the pH value of most natural waters is comprised in the range 6.4 to 8.0, an average figure of 7.2 was selected as a standard of reference. Numerous experiments were also made at other pH values.

The buffer solution is readily prepared by dissolving 34 grams of KH_2PO_4 in about 500 milliliters of distilled water. A solution of sodium hydroxide (40 grams of NaOH per liter, corresponding to 1 M) is then added until a pH value of 7.2 is reached and the solution is made up to 1 liter. Approximately 175 milliliters of 1 M NaOH are required. In comparative tests the arbitrarily selected value of pH 7.2 may be shifted by varying the amount of hydroxide added to the potassium acid phosphate. The hydroxide solution need not be accurately standardized and, with sufficient accuracy, the adjustment of the pH value can be made with color standards or color charts.

Use has been made of this phosphate solution either singly or in combination with other mineral ingredients. (Formula C.)

Apart from their usefulness as buffering agents, it is recognized that phosphates constitute a considerable proportion of the mineral content of bacterial ash, and so, together with traces of iron and other salts, they are presumably to be considered as essential nutrients. Although seldom reported in examinations of water, it is nevertheless true that polluted waters must contain at least traces of phosphates derived from sewage. Cooper and Read found from 0.20 to 0.76 part of phosphate (expressed as phosphorus) per 100,000 parts of sewage effluents. The corresponding figures in terms of KH_2PO_4 are from 9 to 33 parts per million. Froehde (1930) reports 0.55 grams per gallon of P_2O_5 in a sewage effluent, corresponding to 18 parts per million as KH_2PO_4. In work with sewage effluents it appears that phosphates should constitute an important fraction of the total mineralization although, even at a moderate dilution, the phosphate content of a polluted-river water should be very small. Pearsall (1930) gives figures indicating that the phosphate content of a "very clean" stream varies from 0.01 to 0.06 part per million when expressed as KH_2PO_4. Greaves and Hirst (1919) report the presence of from 0.72 to 5.47 parts per million of phosphorus (3.2 to 24.0 parts per million as KH_2PO_4) in 10 of the largest streams in Utah. Such analyses, however, are seldom made and, in the absence of reasonably complete data for representative eastern and middle-western waters, no mention of phosphorus was made in Table 1.

It is evident that, in many respects, the composition of Formula C water is purely arbitrary. It does, however, furnish a readily prepared solution whose mineral salt content and pH value may both be varied over a wide range. For this reason it has appeared desirable to

use such a solution in exploratory experiments designed to test the influence of these factors on the deoxygenation process. It is recognized, however, that several other formulas have been proposed which, on the score of simplicity of preparation, deserve careful consideration in a study of this character.

"BICARBONATE" DILUTION WATERS

Mohlman, Edwards, and Swope (1928) have proposed the use of a dilution water containing 500 parts per million of sodium bicarbonate as the single ingredient. "It may not be the ideal type of water because of the high pH and the lack of variety of cations, but it is an improvement on distilled water or tap waters of widely varying composition." Later (private communication) it was found possible to reduce the bicarbonate content to 300 parts per million.

The keeping properties of a bicarbonate solution when stored at laboratory temperatures are shown in Table 3. In the first experiment a solution containing 300 parts per million of $NaHCO_3$ was stored in a partly filled carboy protected from the air only by a cotton plug. The pH value ranged from 7.8 at the start to 8.3 or 8.4 after two or three weeks of standing. In a second experiment the bicarbonate solution was stored in a tightly stoppered bottle. Under these conditions the pH value did not change. In a third experiment, using cotton-plugged carboys, the pH values at the start with 75, 150, 300, and 500 parts per million of $NaHCO_3$ were 7.5, 7.7, 7.8, and 8.0 respectively. After three weeks at laboratory temperatures, the corresponding pH values had increased to 7.8, 8.0, 8.4, and 8.6. These values are in practical agreement with the known equilibrium values for bicarbonate solutions. (*Cf.* Prideaux, 1917, pp. 205 et seq.)

TABLE 3.—*Effect of aging on pH value of bicarbonate dilution water*

$NaHCO_3$ content, parts per million	Period of storage, in days										
	0	1	2	3	4	6	14	16	22	25	35
	pH values—First experiment										
300	7.8	7.8	8.0	8.2	8.0	8.2	-----	8.3	-----	8.4	8.3
	pH values—Second experiment										
300	7.8	7.8	-----	7.8	-----	7.9	-----	-----	-----	-----	-----
	pH values—Third experiment										
75	7.5	7.6	-----	-----	7.7	7.7	7.7	-----	7.8	-----	-----
150	7.7	7.7	-----	-----	7.8	7.8	7.9	-----	8.0	-----	-----
300	7.8	7.9	-----	-----	8.1	8.1	8.3	-----	8.4	-----	-----
500	8.0	8.1	-----	-----	8.3	8.4	8.6	-----	8.6	-----	-----

The conclusions to be drawn regarding the keeping qualities of the bicarbonate solution are obvious enough. It is perhaps of more consequence that the bicarbonate itself, if exposed to air, may contain a considerable proportion of carbonate.

As a variant of the sodium bicarbonate solution used by Mohlman and his associates, a few tests have also been made with the potassium bicarbonate solution proposed by Forman (1928). Tests have also been made with mixtures of phosphates and carbonates.

Greenfield, Elder, and McMurray (1926) have made use of a dilution water consisting of distilled water to which was added $CaCl_2$ (165 parts per million), KCl (10 parts per million), $MgSO_4 \cdot 7H_2O$ (285 parts per million) and $NaHCO_3$ (336 parts per million). The bicarbonate content of this mineral water is about the same as that recommended by Mohlman (300 parts per million). The total mineralization, on the basis of solids at 180° C., is 516 parts per million. A well-defined nitrification stage was observed when dilution was accomplished with this water. This dilution water bears the same relation to the simpler formula of Mohlman that Formula C water bears to the phosphate solution.

DISCUSSION

In connection with the use of bicarbonate solutions for dilution purposes in oxygen demand tests, the following statements by Waksman (1927) are of interest:

1. "The optimum reaction for the respiration of nitrite-forming organisms was found to be at pH 8.4 to 8.8, with limiting reactions at pH 7.6 and 9.3. The optimum reaction for the respiration of nitrate-forming bacteria was found to be at pH 8.3 to 9.3, and the limits at pH 5.6 and 10.3. The presence of $NaHCO_3$, which acts as a buffer at pH 8.4, is, therefore, beneficial to the activities of these organisms." (*Loc. cit.*, p. 528; see also pp. 392 and 77.)

2. Elsewhere (*loc. cit.*, p. 535): "In view of the fact that CO_2 is used by the (nitrate-forming) organism for the building up of its cells chemosynthetically, its presence is necessary for growth. But since the organism produces only a limited amount of growth, only small amounts of CO_2 are required even for the maximum nitrification. Larger amounts seem to act merely as an inert gas." On page 525: "Nitrites are formed also in an atmosphere free from CO_2 (but containing CO_2 in the medium), although at a slower rate."

3. Again (*loc. cit.*, p. 392): "When phosphates were used as buffering agents the (nitrifying) organism was found to make a normal growth, using the CO_2 coming into solution from the atmosphere. No growth took place in the total absence of CO_2."

It will be noted that the pH values which appear most favorable to nitrification by soil bacteria are much higher than those ordinarily

observed in streams and also in sewage treatment where active nitrification does occur at pH values which in certain cases may be well below 6.0. In fact, Waksman (1928, p. 529) points out that by gradual adaptation (or perhaps by selective culture) the nitrifying organisms can be made to grow at pH values far removed from the usual range of growth of ordinary soil bacteria. Gaarder and Hagem (1922–23) distinguish various nitrifying organisms with respective optima at pH values ranging from 7.9 to 6.5, and Cutler (1930), in work with sugar beet wastes, has extended these values to pH 4.5.

As regards the desirability of providing traces of carbon dioxide for the growth of nitrifying organisms, it is obvious that an ample supply of this constituent will be present when the bicarbonate dilution waters are used. Even with Formula C water, however, it has appeared that a sufficient supply of CO_2 will be assured through the addition of the sample itself with sewage effluents at moderate dilutions or by the prior decomposition of carbonaceous materials in tests with raw sewage.

In passing it may be remarked that, according to Bonazzi (1923), "the presence of KOH in a cultural system stops nitrification * * *." This observation has a direct bearing on the Sierp (1928) method in which a seal of NaOH or KOH is used to remove CO_2 from the system. The failure to observe a second or nitrification stage when this apparatus is used may be due to the removal of CO_2, although, as pointed out by Symons and Buswell (1929), other explanations may be offered.

Another cultural characteristic of the nitrifying organisms which is emphasized in the studies of the soil microbiologists is the relatively high dissolved oxygen requirement of these organisms. With particular reference to nitrate formation the following quotations from Waksman (1927, pp. 393 and 534; see also p. 396) are in point: "A decrease in the concentration of oxygen lessens both growth and respiration, so that at one-tenth atmosphere pressure (0.9 parts per million at 20° C.) respiration is decreased by 66 per cent; the optimum concentration of oxygen for nitrate formation was found to be 35 per cent" (about 16 parts per million at 20° C.).

In our own studies definite evidence has been obtained that nitrite formation may cease when the dissolved oxygen content is reduced to about 2 parts per million. The proposal by Johnson (1924) to increase the dissolved oxygen content of incubated samples and his statement that "the adoption of a higher initial saturation is the crux of the whole matter" may find explanation on the basis that his work was done mainly with partly purified sewage effluents of low dissolved oxygen content.

The importance of these growth requirements of the nitrifying organisms is evident enough when it is considered that the presence of

these highly specialized organisms is essential to the nitrification process, so that, whether intentioned or not, any study of deoxygenation in polluted waters may become a "pure culture" problem when the observations are extended into the second or nitrification stage. The situation in this respect differs materially from that encountered in similar studies of the first or carbonaceous stage where the deoxygenation process is carried on by mixed cultures adaptable to a wide range of variation in such factors as pH value, carbon dioxide tension, and dissolved oxygen content.

There is a wealth of information in the studies of the bacteriologists regarding the effect of mineral salts on the growth of microorganisms. It is seldom, however, that these studies have been accompanied by observations on the decrease in the dissolved oxygen content of the experimental solutions. In the literature of oxygen demand tests the evidence offered is often contradictory. Thus, it appears reasonably well established that nitrate formation is greatly retarded when samples of polluted water are diluted with sea water. (*Cf.* Theriault, 1927, pp. 9–10 for a review.) This view is supported by the work of Cooper and Cooper (1918), Cooper, Cooper, and Heward (1919), and Purvis (1926), who report that, under ill-defined conditions of test, a more vigorous oxidation may be obtained with distilled water than with mineralized dilution waters. However, as noted by Cooper, Cooper, and Heward (1918), the results are by no means consistent, so that a hard water may exert "either a greater or a smaller inhibitory action than a soft water." Again, in certain cases, "it makes no difference whether distilled or river water is used."' On the other hand, the results obtained by Mohlman (1925), Greenfield, Elder, and McMurray (1926), Mohlman, Edwards, and Swope (1928), and by Symons and Buswell (1929) indicate that the use of distilled water as a diluent should be avoided. It is perhaps significant that, in the main, the favorable results reported with distilled water have been obtained with sewage effluents at moderate dilutions (generally 1 to 5), while the unfavorable results are based on examinations of industrial wastes or raw sewage.

On the basis of the foregoing discussion and of numerous experiments in this laboratory, it has appeared clearly indicated that the effect of mineral salts on the deoxygenation process could not be considered apart from the state of oxidation of the samples. In the present paper a considerable simplification in the presentation of data will be effected by limiting the discussion largely to the influence of mineral salts on the first or carbonaceous stage of deoxygenation. Under these conditions, as will presently be shown, the adjustment of such variables as the pH value and the dissolved oxygen content is not critical. In fact, within wide limits, the nature and the concentration of the mineral salts themselves may be of little consequence,

provided that some degree of mineralization is afforded. The more formidable array of variables encountered in studies of nitrification will be considered in a separate paper.

EXPERIMENTAL PROCEDURE

It was apparent in preliminary studies that the effect, if any, produced by certain variations in technique was so small as to be practically within the limits of experimental error. For this reason, whenever possible, all work was done in duplicate so that the experimental error in any given experiment is well-defined. Moreover, in order that systematic deviations due to the dilution water itself might be eliminated, it was decided that all work should be done at two different concentrations. For reasons already noted, it was also considered advisable to obtain several points along the deoxygenation curve, so that the trend under various experimental conditions would be accurately defined with samples in various stages of oxidation. While these analytical safeguards would be needlessly severe in routine determinations, they have not appeared unreasonable for the purpose at hand.

Following this general method of procedure, it was evidently necessary to make provision for the preparation of very large numbers of subsamples of a given diluted sample. This was done by adding suitable amounts of the sample to measured volumes of dilution water contained in 20-liter carboys. After thorough mixing, the mixture was siphoned to glass-stoppered bottles of approximately 300 milliliters capacity. In certain experiments, 8 or 10 carboys of 20 liters capacity were required and the number of 300-milliliter bottles filled from these carboys may have exceeded 200. Whenever the time required for the setting up of an experiment was considerable, special precautions were taken to avoid unevenness of sampling.

In all experiments the temperature of incubation was maintained within one degree of 20° C. At the start of a test the dissolved oxygen content was adjusted to about 9.0 parts per million by the application of suction to partly filled carboys in case the dilution water was supersaturated with oxygen or by storage at room temperature when an insufficient amount of oxygen was present.

For reasons which will be discussed more fully elsewhere, it was not considered necessary to use the Rideal-Stewart (permanganate) modification of the Winkler method unless nitrites to the extent of 0.1 parts per million or more were present in the diluted samples. The titrations were invariably performed with 0.025 M sodium thiosulphate, using a volume of iodine solution corresponding to 200 milliliters of the original sample.

The dissolved oxygen determinations in most experiments were paralleled by nitrite determinations. For obvious reasons, these two

tests could not be made on the same subsample. It is believed, however, that the trend at least is very well shown by this procedure even though the nitrite results in certain instances may not be actually synchronized with the oxygen demand tests.

In all experiments the results obtained have been referred to the original waste. Thus, the observed loss of oxygen with a 2 percent mixture of sewage has invariably been multiplied by 50 to obtain the loss which might have been observed in the undiluted sample. The nitrite results, likewise, have been referred to the original sample by the application of a suitable factor, generally 25 or 30.

The tests described in this paper were invariably made on sewage samples and not on synthetic mixtures. In some experiments use was made of catch samples collected from a small sewer (Third Street, Cincinnati, Ohio) into which acid wastes from a glass-etching plant are intermittently discharged throughout the day. Although the use of sewage which was actually acid was avoided by preliminary tests of alkalinity and pH, it is believed that in several instances the seeding may have been considerably reduced by prior scouring of the sewerage system with spent acids. On the basis of extended bacteriological tests the total count on agar at 20° C. for this sewage is generally in the neighborhood of 100,000. This figure may be compared with a count of about 1,000,000 per cubic centimeter in "normal" sewage. The inclusion of results obtained with this sewage appears justifiable in exemplification of certain trends which have not hitherto been observed in this laboratory.

In other experiments the sewage sample was drawn from a large tank used in other experiments for the storage of night sewage from the Third Street sewer. This sewage is presumably free from acid waste and is reasonably representative of residential wastes.

As a third source of experimental material, catch samples of 1 gallon were collected from a very large sewer (Walnut Street) which drains the downtown districts of Cincinnati. There is no evidence of the presence of inhibitory wastes in this sewage and it may be regarded as fairly representative of average city sewage.

Unless specific mention to the contrary is made, it will be understood that reliance for seeding was placed wholly on the organisms present in the sewage as collected or by chance contamination of the apparatus and of the dilution waters.

The distilled water used in these experiments was prepared from Cincinnati tap water using a Barnstead still, which, as a rule, was operated at a high rate. Under ordinary conditions of collection and storage this distilled water is generally contaminated with bacteria and it possesses a small, but measurable, oxygen demand. This is shown in Table 4, where average results are presented with freshly prepared distilled water and with the same water after a preliminary

period of 30 days at 20° C. For these vanishingly small oxygen demand values the usual titration error of about 0.03 parts per million may exceed the actual oxygen requirement of the distilled water, at least over the shorter periods of incubation. It is to be expected, however, that the titration error will balance out when several determinations are averaged. In Table 4 a reasonable degree of orderliness was secured by averaging six observations (three observations on a given day by each of two observers). On the basis of these experiments, no correction for the oxygen demand of the distilled water itself has been applied in any of the experiments presented in this paper.

TABLE 4.—*The oxygen demand of distilled water*

Preliminary period of storage, days	Period of incubation, in days					
	1	2	3	6	8	10
	Oxygen demand, parts per million					
1	0.05	0.08	0.09	0.15	0.15	0.17
30	.00	.02	.09	.07	.08	.11

PRECISION OF THE BASE DATA

In comparisons of oxygen demand results obtained under various experimental conditions it is fair to assume that, in terms of actually measured depletions, the standard deviation will be about 0.10 part per million irrespective of the magnitude of the observed depletion. (*Cf.* Theriault, 1927, pp. 152–164.) The error in question arises from inevitable inaccuracies in titrations and in other manipulations, including laboratory sampling. When depletions of 1.00 and 4.00 parts per million are obtained with 2 per cent mixtures of sewage, the corresponding oxygen demand values become 50 ± 5 and 200 ± 5. While the percentage error varies from 2.5 to 10 per cent, the error in parts per million is the same in each case. As an indication of experimental precision, duplicate determinations at the same concentration of sewage giving 50 and 55 parts per million in 1-day observations are to be regarded as favorably as the corresponding 5-day results of, say, 200 and 205 parts per million. In comparisons of oxygen demand values obtained with different concentrations of sewage, allowance should be made for an expected experimental error of 7 or 8 parts per million. On this basis an allowance should be made of about 10 parts per million when results with different dilution waters are compared. Systematic divergencies or trends may, of course, be superimposed on the usual plus or minus errors of observations.

GENERAL DESCRIPTION OF THE EXPERIMENTS

In general outline, the order of presentation of the data will be as follows:

1. In series A, B, C, and D the results obtained when ordinary distilled water was used as a diluent will be compared with similar

results using various mineralized waters. The concentration of the mineral salts used in these experiments was selected arbitrarily.

2. In other experiments (series E to J), the effect of varying the concentration of the mineral salts will be considered and more extended comparisons will be made of various mineralized solutions.

3. Consideration will next be given to the effect of variations in the pH value of the various dilution waters (series K to N).

4. Comparative tests on tap waters and synthetic dilution waters will then be presented (series N).

5. Finally, attention will be paid to the character of the seeding as a possible cause of observed differences in the results obtained under different experimental conditions (series O).

RESULTS WITH DISTILLED WATER AS THE DILUENT

The results presented in Table 5 were obtained in three series of experiments (July 8, 10, and 15, 1929) with different sewage samples using ordinary distilled water as the diluent. The alkalinity of the sewage samples was 145, 120, and 105 parts per million, respectively, in series A, B, and C. The corresponding pH values of the undiluted sewage were 7.5, 7.5, and 7.2. In each case the only mineral salts present were those added along with the sample itself.

TABLE 5.—*Series A, B, and C—Results with distilled water as the diluent*

Series	Concentration of sewage, per cent	Period of incubation, in days: 0	1	2	3	5	7	10
		Duplicate oxygen demand results, parts per million						
A	2.5		85	125	153	239	263	273
			87	131	149	lost	251	271
	5.0		87	139	(1)			
			83	130	(1)			
B	1		(10)	180	205	285	325	365
	2		83	193	283	363	346	376
			76	210	238	338	346	353
	4		141	(1)				
C	1		(17)	147	202	357	377	442
	2		108	208	235	288	328	380
			52	218	228	348	325	368
	4		146	196	(1)			
		pH values						
A	2.5	7.1	6.6	5.6	5.9	5.6	5.6	5.6
B	2.0	8.0	7.3	8.5	8.1	8.0	8.0	8.2
C	2.0	9.2	8.3	7.1	6.9	6.7	6.7	6.8
		Relative oxygen demand [2]						
A			36	56	63	(100)	108	114
B			30	59	74	(100)	103	111
C			31	58	67	(100)	104	120
Average			32	56	68	(100)	105	115

[1] Depleted.
[2] Basis of the average values, omitting 2 bracketed items. The average 5-day demand has been arbitrarily assigned a value of 100.

In series A the diluted mixtures contained 2.5 and 5.0 per cent of sewage. The 2.5 per cent mixture accordingly contained at least $0.025 \times 145 = 3.6$ parts per million of mineral salts and the 5.0 per cent mixture contained twice as much.

In series B and C, the mixtures used contained 1, 2, and 4 per cent of sewage. Owing to the added number of bottles required, duplicate tests were made only with the 2 per cent mixture.

The pH value at the start of the experiment in Series A was 7.1 on the basis of measurements made on the 2.5 per cent mixture. In the series B and C, the pH values at the start were 8.0 and 9.2, respectively, in the 2 per cent mixtures. These relatively high values are due to the use of tap water instead of distilled water for rinsing the bottles and carboys prior to use. By reason of excess lime treatment, the pH value of Cincinnati tap water is frequently in the neighborhood of 9 to 10. Traces of this water would, of course, greatly influence the pH value of unbuffered distilled water, although the mineral salt content would not be appreciably affected.

In series A, with the highest content of extraneous mineral salts and the lowest pH value, there is good agreement between duplicate observations using either 2.5 or 5.0 per cent of sewage.

In series B and C the agreement between duplicates (2 per cent mixtures) is occasionally good, but the agreement between the three different concentrations (1, 2, and 4 per cent) is poor. There is evidence of a marked lag when the results obtained during the first few days are compared. In series B this difference persists to the tenth day, while in series C the 1 per cent mixture gives relatively high results beyond the fifth day.

The unsatisfactory results obtained in series B and C, in comparison with series A, might be ascribed to pH effects, although the evidence is doubtful beyond the first day. Differences in the mineral salt content of the diluted mixtures due to varying concentrations of sewage are also to be considered, although the total concentration of extraneous mineral salt in each experiment was small. In fact, when the average values are placed on a comparable basis (see lower part of Table 5), the trend in each series of observations appears to have been very much the same. In deriving these relative values, the average values obtained in a given series of observations were first divided by the corresponding 5-day oxygen demand. The quotients obtained were then multiplied by 100.

Using the same sewage samples and following the same general procedure, comparative tests were also made with bicarbonate dilution water (500 parts per million $NaHCO_3$) and with Formula C water. With bicarbonate dilution water (see Table 6), the agreement between duplicates was excellent in all three experiments. The agreement between different concentrations, however, is only fair in

series B and C. As indicated by the relative values given at the bottom of Table 6, the course of the deoxygenation was substantially the same in each series of experiments with bicarbonate dilution water.

As a rule, the agreement between results obtained with different concentrations of sewage in bicarbonate dilution water has been better than that shown in series B and C. In good measure this may have been due to the use in early experiments of a sample of sodium bicarbonate which, through aging, may have contained a considerable proportion of carbonate. This is indicated by the relatively high pH value of the bicarbonate mixtures. In all subsequent work use was made of a fresh supply of the salt which was preserved in a tightly stoppered bottle. It is also to be noted that 500 parts per million of $NaHCO_3$ were used in these experiments.

TABLE 6.—*Series A, B, and C—Results with bicarbonate water as the diluent*

Series	Concentration of sewage, per cent	Period of incubation, in days: 0	1	2	3	5	7	10
		Duplicate oxygen demand results, parts per million						
A	2.5	--------	120	170	210	254	280	298
		--------	118	164	210	270	272	296
	5.0	--------	124	166	(1)	--------	--------	--------
		--------	124	162	(1)	--------	--------	--------
B	1	--------	115	205	245	375	395	415
	2	--------	142	222	292	352	362	382
		--------	152	217	287	367	362	384
	4	--------	173	(1)	--------	--------	--------	--------
C	1	--------	150	220	305	415	475	520
	2	--------	172	258	360	(1)	--------	--------
		--------	178	258	360	425	--------	--------
	4	--------	182	(1)	--------	--------	--------	--------
		pH values						
A	2.5	9.7	7.7	7.6	7.6	7.3	7.7	7.7
B	2.0	8.2	8.2	8.1	7.9	8.0	8.0	7.9
C	(2)	--------	--------	--------	--------	--------	--------	--------
		Relative oxygen demand [3]						
A	--------	--------	47	63	80	(100)	105	113
B	--------	--------	40	59	75	(100)	102	108
C	--------	--------	40	58	81	(100)	113	124
Average	--------	--------	42	60	79	(100)	107	115

[1] Depleted.
[2] No test made.
[3] Basis of the average values. The average 5-day demand has been arbitrarily assigned a value of 100.

With Formula C water (Table 7) the agreement between duplicate determinations is very satisfactory throughout and, on the whole, the agreement using different concentrations is also good. It is evident, from the values given at the bottom of Table 7, that the

relative amount of oxygen used up on a given day was very much the same with all three samples.

It is noteworthy that with Formula C water there is little evidence of lag with the lower concentrations during the first few days of incubation. Using distilled water (Table 5), the average results obtained on the first day in series B with 1, 2, and 4 per cent mixtures were 10, 80, and 141 parts per million, respectively. With bicarbonate water (Table 6) the corresponding averages were 115, 147, and 173. These results are somewhat closer together than the preceding set, although the absolute agreement still leaves much to be desired. With Formula C water (Table 7) the same sewage mixtures lead to 1-day values of 170, 172, and 178 parts per million. These results show a slight trend, although the general agreement is within the experimental error. It is significant that the highest value (173) obtained with bicarbonate water was also of the same order of magnitude.

TABLE 7.—*Series A, B, and C—Results with Formula C as the diluent*

Series	Concentration of sewage, per cent	Period of incubation, in days: 0	1	2	3	5	7	10
		Duplicate oxygen demand results, parts per million						
A	2.5	-------	137	179	215	255	275	305
		-------	138	185	217	267	275	273
	5.0	-------	142	(1)	-------	-------	-------	-------
		-------	144	(1)	-------	-------	-------	-------
B	1	-------	170	235	290	335	365	395
	2	-------	175	248	275	328	352	370
		-------	170	248	290	342	348	375
	4	-------	178	(1)	-------	-------	-------	-------
C	1	-------	202	287	312	392	422	462
	2	-------	190	230	308	375	412	(1)
		-------	188	268	320	375	410	(1)
	4	-------	183	(1)	-------	-------	-------	-------
		pH values						
A	2.5	7.4	6.9	6.9	6.9	6.8	6.9	7.0
B	2.0	7.2	7.1	7.0	7.0	6.9	6.9	7.0
C	2.0	7.3	7.1	6.9	7.0	6.9	6.9	7.1
		Relative oxygen demand [2]						
A	-------	-------	54	70	83	(100)	105	111
B	-------	-------	52	73	85	(100)	106	113
C	-------	-------	50	69	82	(100)	109	121
Average	-------	-------	52	71	83	(100)	107	115

[1] Depleted.
[2] Basis of average values. The average 5-day demand has been arbitrarily assigned a value of 100.

To facilitate the further comparison of the results obtained in these three experiments with different dilution waters, the average values obtained in each experiment have been summarized in Table

8. Without exception the lowest values were obtained with distilled water. Bicarbonate water gave lower results than Formula C water during the first few days. Thereafter the results with bicarbonate water are equal to or higher than those obtained with Formula C water. As indicated in the lower part of Table 8, the relative values obtained over the usual 5-day period of incubation are 100, 106, and 92, respectively, for Formula C water, bicarbonate water, and distilled water. When the relative values obtained with bicarbonate water and with Formula C water are compared, it is apparent that, for most practical purposes, the differences observed would not be damaging. It is significant, nevertheless, that systematic differences do exist which, as indicated by the excellent agreement between strict duplicates, can not be ascribed to experimental errors.

TABLE 8.—*Series A, B, and C—Average results with different diluents*

Series	Dilution water used	Period of incubation, in days					
		1	2	3	5	7	10
		Average oxygen demand, parts per million					
A	Distilled	86	133	151	239	257	272
	Bicarbonate	122	166	210	262	276	297
	Formula C	140	182	216	261	275	289
B	Distilled	100	194	242	329	339	365
	Bicarbonate	146	215	275	365	373	394
	Formula C	173	244	285	335	355	380
C	Distilled	102	192	222	331	343	397
	Bicarbonate	170	245	342	420	475	520
	Formula C	191	262	313	381	415	462
		Relative oxygen demand [1]					
A	Formula C	54	70	83	(100)	105	111
B		52	73	85	(100)	106	113
C		50	69	82	(100)	109	121
Average		52	71	83	(100)	107	115
A	Bicarbonate	47	64	80	100	106	114
B		44	64	82	109	111	118
C		45	64	90	110	125	136
Average		45	64	84	106	114	123
A	Distilled	33	51	58	92	98	104
B		30	58	72	98	101	109
C		27	50	58	87	90	104
Average		30	53	63	92	96	106

[1] For each series of observations, the 5-day oxygen demand obtained with Formula C water has been assigned the arbitrary value of 100.

The samples used in series A, B, and C were drawn from the Third Street sewer on the day of the tests. Better agreement was obtained in series D when use was made of sewage from the same source composited throughout the night so as to exclude acid wastes. In addition to the dilution waters already used, comparative tests were also

made with phosphate dilution water containing 5 milliliters of stock buffer solution per liter.

As shown in Table 9, the agreement between duplicates at each of two concentrations of sewage (2 and 4 per cent) is excellent throughout. Excepting the results obtained on the second day with distilled water, the agreement between different concentrations is likewise very good. The nitrite content, referred to the undiluted samples, ranged from 0.25 to 0.50 parts per million at the start, and it decreased during the first five days, presumably as the result of air oxidation. Between the seventh and eleventh days, however, there is unmistakable evidence of nitrite formation, except in Formula C water. The increase, however, was not great enough to exert a material effect on the oxygen demand values.

The average values presented in Table 9 indicate good agreement between the results obtained with the bicarbonate and the phosphate waters. The results with Formula C water are relatively high. Distilled water, as in series A, B, and C, gave results which, while consistent among themselves, are relatively low.

TABLE 9.—*Results with four dilution waters*

Dilution water used	Sewage concentration, per cent	Period of incubation, in days: 1	2	5	7	11
		Oxygen demand, parts per million				
Distilled	2	38	50	112	123	134
		38	52	104	125	134
	4	42	69	114	124	142
		42	70	110	124	144
Bicarbonate	2	52	77	127	142	160
		50	73	133	144	162
	4	52	82	125	137	152
		52	82	127	134	156
Phosphate	2	52	75	119	125	158
		58	73	121	142	154
	4	51	79	117	131	154
		50	80	119	131	155
Formula C	2	58	93	131	147	176
		58	87	131	152	166
	4	56	87	127	144	158
		58	88	128	144	157
		Relative oxygen demand [1]				
Distilled	2, 4	36	55	(100)	113	125
Bicarbonate	2, 4	41	61	(100)	109	123
Phosphate	2, 4	45	65	(100)	111	130
Formula C	2, 4	44	69	(100)	114	127

[1] Basis of the 5-day results obtained with each dilution water.

The relative oxygen demand values given in Table 9 were obtained, as before, by assigning an arbitrary value of 100 to the 5-day oxygen demand values obtained with each dilution water. The course of the deoxygenation was evidently much the same with the three mineralized waters. For the first 5 days these relative values are in

good agreement with those obtained in series A, B, and C (Tables 5, 6, and 7) with the corresponding dilution waters.

EFFECT OF VARIATIONS IN THE MINERAL SALT CONTENT OF FORMULA C DILUTION WATER

The results obtained when the mineral salt content of Formula C water was varied from 87 to 348 parts per million are given in Table 10 (series E). The source of the sewage sample was the same as that in series D (composited night flow). The pH value of the sewage was 7.5.

Irrespective of mineral salt concentration, the agreement between duplicate determinations using 2 or 4 per cent of sewage is very satisfactory. The agreement between results obtained with different concentrations of sewage is likewise good up to the tenth day when active nitrification was first observed. As shown by the average values given at the bottom of Table 10, there is a slight but nevertheless distinct tendency toward progressively lower results as the concentration of mineral salts is increased. The difference, however, is within the expected experimental error.

TABLE 10.—*Series E—Effect of variation in the mineral salt content of Formula C water*

Concentration of mineral salts, parts per million	Sewage concentration, per cent	Period of incubation, in days: 2	3	5	7	10
		Oxygen demand, parts per million				
348	2	120	150	200	207	230
		117	160	192	217	225
	4	132	154	188	219	243
		132	158	191	217	244
174	2	126	159	203	215	245
		124	157	208	222	240
	4	123	163	198	221	237
		136	165	200	220	243
87	2	140	163	215	216	241
		137	160	210	220	240
	4	133	165	199	220	244
		135	163	199	216	241
		Nitrite nitrogen, parts per million				
348	2	--------	--------	0.35	0.35	0.35
	4	--------	--------	.38	.38	2.5
174	2	--------	--------	.35	.35	1.5
	4	--------	--------	.38	.50	3.0
87	2	--------	--------	.35	.35	1.0
	4	--------	--------	.38	.38	1.5
		Average oxygen demand, parts per million				
348	2, 4	125	156	193	215	236
174	2, 4	127	161	202	220	241
87	2, 4	136	163	206	218	242

The 5-day oxygen demand in each of these three experiments at different concentrations of mineral salts was in the neighborhood of 200 parts per million, corresponding to an observed reduction of about 8 parts per million in the dissolved oxygen content of the diluted samples which contained 4 per cent of sewage. The dissolved oxygen content of the 4 per cent mixtures was around 8.7 parts per million at the start of the test, and on the fifth day this figure had been reduced to about 0.7 part per million. In order to continue the experiment with the 4 per cent mixtures, the contents of the 300-milliliter bottles used for incubation purposes were poured into a large container and reaerated by agitation in the presence of air. The 300-milliliter bottles were then refilled by siphoning, and a new figure was obtained for the dissolved oxygen content.

It is noteworthy that this treatment of the 4 per cent mixtures was without effect on the subsequent agreement on the seventh and tenth days with the 2 per cent mixtures which were left undisturbed. From this and numerous other experiments (*cf.* Theriault and Hommon, 1918) it might appear reasonable to conclude that the rate and extent of deoxygenation are not greatly affected even by extreme fluctuations in the dissolved oxygen content of diluted samples. In the light of present knowledge, however, this conclusion must be restricted to the first or carbonaceous stage of oxidation, as ample evidence now exists that nitrification is adversely affected when the dissolved oxygen content falls to 2 parts per million or less, corresponding to a depletion of over 75 per cent under ordinary conditions.

Another set of observations (series F) with Formula C water is given in Table 11, together with comparative results using bicarbonate water and the same sample of sewage. In each case the values given are averages of closely agreeing duplicate determinations at two concentrations. As before, the results appear progressively lower as the mineral salt content of Formula C water is increased. Throughout this series of observations the results with bicarbonate water are from 5 to 10 per cent higher than the highest results obtained with Formula C water. It is of interest to note, however, that this disagreement refers only to the extent and not to the rate or the course of the deoxygenation. This is shown by the relative values given in Table 11, where the 5-day demand in each of the four experiments has been assigned a value of 100. The agreement between these relative oxygen demand values is striking.

TABLE 11.—*Series F—Effect of variation in the mineral salt content of Formula C water*

Dilution water used	Concentration of mineral salts, parts per million	Sewage concentration, per cent	Period of incubation, in days											
			1	2	3	5	7	10	15	17	20	24	27	30
			Average oxygen demand results, parts per million											
Formula C	348	2, 4	46	67	82	98	109	122	----	----	----	----	----	----
Do	174	2, 4	46	66	83	103	112	126	----	----	----	----	----	----
Do	87	2, 4	50	72	92	111	120	138	146	154	160	181	192	204
Bicarbonate	300	2, 4	52	77	97	120	132	148	162	165	172	198	214	219
			Relative oxygen demand results											
Formula C	----	----	47	68	84	100	111	124	----	----	----	----	----	----
Do	----	----	45	64	81	100	109	122	----	----	----	----	----	----
Do	----	----	45	65	83	100	108	124	131	139	144	163	173	184
Bicarbonate	----	----	43	64	81	100	110	123	135	138	143	165	178	182

Mention should be made of the fact, that, on the basis of repeated examinations for nitrites and free ammonia, nitrification did not take place in this particular experiment, although nitrification has generally been observed both with Formula C and bicarbonate dilution waters. While direct observations were not made, the absence of a seeding of nitrifying organisms in this particular sample of sewage does not appear improbable.

Owing to the expected exhaustion of dissolved oxygen the 4 per cent mixtures were reaerated on the seventeenth day. The 2 per cent mixtures were likewise reaerated on the twentieth day. As in series E this procedure was without effect on the subsequent agreement between the 2 and 4 per cent mixtures.

EFFECT OF VARIATIONS IN THE MINERAL SALT CONTENT OF THE BICARBONATE DILUTION WATER

The effect of variations in the mineral salt content of bicarbonate dilution water is shown by the duplicate observations (series G) presented in Table 12. The agreement between duplicates at a given concentration of sewage (2 or 3 per cent) or of mineral salts (75 to 300 parts per million) is excellent. On the whole, however, the results with 2 per cent of sewage are distinctly lower than in the 3 per cent mixture. When average values are compared the results with 75, 150, and 300 parts per million are well within an allowable error of 10 parts per million.

Table 12.—*Series G—Effect of variations in the mineral salt concentration of bicarbonate dilution water*

Concentration of $NaHCO_3$, parts per million	Sewage concentration, per cent	Period of incubation, in days: 1	2	3	5	7	10
		Oxygen demand, parts per million					
300	2	38	60	77	98	122	136
		42	60	83	104	145	135
	3	39	64	87	108	124	140
		46	66	87	109	136	134
150	2	32	56	66	92	112	126
		32	56	69	93	110	124
	3	43	65	86	110	123	130
		39	65	89	109	125	134
75	2	37	56	78	101	118	126
		37	59	74	96	123	126
	3	38	62	99	100	116	129
		35	63	75	103	119	129
		Average oxygen demand, parts per million					
300	2, 3	41	62	84	105	132	136
150	2, 3	36	60	78	101	118	128
75	2, 3	37	60	82	100	119	128

In series H a comparison was made of bicarbonate dilution waters containing, respectively, 300 parts per million of $NaHCO_3$ and the molecular equivalent or 376 parts per million of $KHCO_3$. As shown in Table 13 the agreement between duplicates is generally very satisfactory. The agreement between results obtained with 1 and 2 per cent of sewage in sodium bicarbonate dilution water is excellent, except on the third day. These results are also in satisfactory agreement with the values obtained with 1 per cent of sewage in potassium bicarbonate dilution water. When 2 per cent of sewage was used, the results with potassium bicarbonate water appear relatively low. The sewage used in these experiments was a catch-sample collected from the Walnut Street sewer. The pH value of the sewage was 7.4.

Table 13.—*Series H—Comparison of bicarbonate dilution waters*

Dilution water used	Concentration of mineral salts, parts per million	Sewage concentration, per cent	Period of incubation, in days: 1	3	5	7	9
			Oxygen demand, parts per million				
$NaHCO_3$	300	1	87	164	228	256	263
			81	152	244	282	263
		2	83	188	242	252	268
			86	188	241	254	264
$KHCO_3$	376	1	72	172	235	295	277
			79	165	239	241	261
		2	70	167	213	235	236
			68	170	210	230	238

THE EFFECT OF VARIATIONS IN THE MINERAL SALT CONTENT OF THE PHOSPHATE DILUTION WATER

In series I the dilution water consisted of distilled water to which varying amounts of phosphate solution buffered at pH 7.2 were added. As shown in Table 14 the agreement between duplicates is excellent irrespective of the concentration of mineral salts or of sewage. On the first and third days, however, there is a marked discrepancy between the results obtained with different concentrations of sewage although subsequent agreement is very satisfactory, irrespective of the degree of mineralization or the amount of added sewage. The same tendency was manifested in series J (Table 15) where comparative tests with bicarbonate dilution waters and with Formula C water at pH 7.2 are also presented. In each case the agreement between duplicates is excellent. With increasing amounts of phosphate buffer the oxygen demand results appear progressively higher during the first five days. As already noted, Formula C water in full strength (348 parts per million) gives slightly lower results for the first five days. On the seventh day the general agreement is good with all five dilution waters and at each of the concentrations of sewage.

TABLE 14.—*Series I—Effect of variations in the mineral salt content of phosphate dilution water*

Concentration of mineral salts, parts per million	Sewage concentration, per cent	Period of incubation, in days				
		1	3	5	7	9
		Oxygen demand, parts per million				
189	1	54	139	216	240	258
		49	139	207	238	255
95	1	57	137	224	226	249
		57	134	204	242	216
47	1	57	117	199	219	233
		59	114	205	214	236
189	2	65	164	205	232	234
		75	159	208	229	236
95	2	61	151	200	213	223
		66	153	200	232	226
47	2	67	155	214	230	241
		72	154	210	227	230
		Average oxygen demand, parts per million				
47-189	1	56	130	209	230	241
47-189	2	68	156	206	227	232

Table 15.—*Series J—Oxygen demand results with phosphate dilution water*

Dilution water used	Concentration of mineral salts, parts per million	Sewage concentration, per cent	Period of incubation, in days: 1	3	5	7	17: Observed	17: Corrected
			Oxygen demand, parts per million					
Phosphate	189	2	46	92	120	138	170	165
			51	88	115	148	192	187
		4	60	113	133	147	189	177
			60	112	129	148	206	194
Do	95	2	51	90	115	152	195	190
			54	87	112	148	195	190
		4	55	107	126	135	209	191
			56	107	125	142	202	184
Do	47	2	50	78	106	139	168	163
			50	82	106	142	182	177
		4	54	104	125	141	201	177
			54	103	125	143	210	186
Bicarbonate	300	2	52	85	110	140	210	186
			48	89	105	138	207	183
		4	57	107	133	144	209	185
			56	109	130	146	214	190
Formula C	348	2	55	85	108	139	220	190
			50	85	110	138	225	195
		4	54	99	117	132	203	179
			54	100	115	132	207	183
			Nitrite nitrogen, parts per million					
Phosphate	200	2	0.10	0.10	0.10	0.10	2.5	--------
		4	.05	.05	05	05	6.2	--------
	100	2	.10	.10	10	10	2.5	--------
		4	05	.05	05	05	8.8	--------
	50	2	.10	.10	10	10	2.5	--------
		4	05	.05	.05	.08	12.	--------
Bicarbonate	300	2	.10	.10	.15	.10	12.	--------
		4	05	.05	.15	18	12.	--------
Formula C	360	2	10	10	.10	10	15	--------
		4	.05	.05	.05	10	12.	--------

As shown in Table 15, nitrification did not start in series J until after the seventh day. Active nitrification, however, was in progress on the seventeenth day, when the next observations were made. There is good correlation between the variations in the 17-day oxygen demand results and the corresponding degree of observed nitrite formation. This is shown in the last column of Table 15 where allowance for varying degrees of nitrification has been made by deducting two parts per million from the observed oxygen demand for each part per million of observed nitrite nitrogen. For all five dilution waters and for each of two concentrations of sewage the corrected values are in reasonable agreement with the general average of 183 parts per million for the corrected results obtained on the seventeenth day.

There is no evidence in these experiments of the catalytic activity claimed by Cooper and Reed (1927) for potassium acid phosphate.

THE EFFECT OF VARIATIONS IN pH

The effect of variations in pH on the rate and extent of deoxygenation of diluted sewage is shown in Table 16 (series K) by duplicate determinations using phosphate dilution waters adjusted to pH 8.3, 7.2, and 5.9. Parallel observations using bicarbonate dilution water (pH 8.0) are also included. The pH value of the sewage used in these experiments was 7.4. As usual, the agreement between duplicate determinations under any condition of test is excellent. When results with different concentrations of sewage are compared the best agreement is shown in the phosphate water buffered at pH 7.2. At other pH values there is a distinct tendency on the third day toward lower results with lower concentrations of sewage. On the whole, however, the general agreement is very satisfactory, irrespective of sewage concentration, pH value, and nature of the mineral salts. As shown by the nitrite nitrogen results, nitrification was just beginning on the tenth day in the samples buffered at pH 8.3 while a lesser degree of nitrification is indicated at pH 7.2 and 8.0.

TABLE 16.—*Series K—Effect of variations in pH*

Dilution water used	pH values		Concentration of sewage, per cent	Period of incubation, in days				
	At start	At finish		1	3	5	7	10
				Oxygen demand, parts per million				
Phosphate	8.3	7.8	2	48	75	142	168	151
				48	73	142	150	159
			3	48	105	133	148	157
				49	108	141	148	157
Do	7.2	7.0	2	50	112	146	153	156
				50	112	142	152	156
			3	48	107	138	148	166
				50	110	134	150	154
Do	5.9	6.4	2	41	91	135	142	147
				47	88	134	143	168
			3	43	103	130	145	150
				48	103	133	142	142
Bicarbonate	8.0	7.6	2	44	93	137	143	155
				40	96	131	147	153
			3	47	107	126	151	156
				47	108	128	156	159
				Average oxygen demand, parts per million				
Phosphate	8.3	7.8	2,3	48	90	140	154	156
	7.2	7.0	2,3	50	110	140	151	158
	5.9	6.4	2,3	45	96	133	143	152
Bicarbonate	8.0	7.6	2,3	44	101	130	149	156
				Nitrite nitrogen, parts per million				
Phosphate	8.3	7.8	2	0.20	0.20	0.20	0.20	1.5
	7.2	7.0	2	.20	.20	.20	.20	.50
	5.9	6.4	2	.20	.20	.20	.20	.20
Bicarbonate	8.0	7.6	2	.20	.20	.20	.20	.30

In series L the pH value of the sewage as drawn from a storage tank was 7.6. As shown in Table 17 by average values obtained from closely agreeing duplicate determinations, the agreement is good when the dilution was made with phosphate water buffered at pH 8.3 and 7.2 and also with Formula C water at pH 7.2. Using phosphate dilution water adjusted to pH 6.0, the oxygen demand values appear relatively low and, for the first few days at least, the agreement between the 2 and 4 per cent sewage mixtures is poorer than at higher pH values. The discrepancies, in any event, are small. Active nitrification was in progress at all pH values when this series of observations was terminated.

TABLE 17.—*Series L—Effect of variations in pH*

Dilution water used	pH values		Concentration of sewage, per cent	Period of incubation, in days					
	At start	At finish		1	2	4	7	10	11
				Average oxygen demand, parts per million					
Phosphate	8.3	7.8	2	51	95	126	156	162	164
			4	57	97	136	156	168	177
Do.	7.2	7.1	2	54	90	136	162	187	171
			4	60	96	126	148	156	162
Do.	6.0	6.0	2	48	72	102	138	154	153
			4	55	84	120	144	155	160
Formula C	7.2	7.2	2	60	92	122	138	155	157
			4	64	98	134	150	162	168

In series M the adjustment of pH was made by adding sodium carbonate (instead of sodium hydroxide) to solutions of potassium acid phosphate. The pH values selected for the experiment were 8.4, 8.0, and 7.2. After nine days of incubation these values had been reduced to 7.7, 7.3, and 7.1 in the 4 per cent sewage mixtures. The corresponding values in the 2 per cent mixtures were 7.9, 7.6, and 7.2. The pH value of the sewage was 7.4. As shown in Table 18 there is good general agreement between the results obtained at the neighboring value of pH 7.2. At higher pH values the agreement between strict duplicates is excellent but there is a pronounced trend when results with different concentrations of sewage are compared. There is some evidence in this series of experiments that a marked departure in the pH value of the dilution water from that of the undiluted sewage is unfavorable to the deoxygenation process. It should be noted, however, that the buffer strength of the solutions adjusted to pH 8.4 and 8.0 was very weak. In this respect these results are comparable with similar data presented by Garner (1922).

Table 18.—*Series M—Effect of variations in pH using phosphate-carbonate water*

pH values: At start	pH values: At finish	Concentration of sewage, per cent	Period of incubation, in days: 1	2	4	6	9
			Oxygen demand, parts per million				
8.4	7.9	2	40	67	101	117	124
			46	65	106	116	124
	7.7	4	55	84	111	124	139
			53	84	108	124	136
8.0	7.6	2	50	74	104	124	126
			47	74	103	124	130
	7.3	4	53	85	115	132	142
			53	87	112	125	133
7.2	7.2	2	47	76	118	130	139
			46	74	115	130	135
	7.1	4	53	87	116	132	141
			52	88	115	132	141

Comparisons of Tap Waters with Synthetic Waters

In series N (Table 19) a comparison was made of Cincinnati tap water with various synthetic dilution waters. In one case the tap water was stored for six days prior to the test, and its pH value was reduced from 8.7 to 7.4 by expired air. The pH value of the other tap water was 7.7. This water had been stored for several years, and it was filtered free from algal growths prior to the test. No corrections were applied for the oxygen demand of these dilution waters. The phosphate solution contained 47 parts per million of total solids. The bicarbonate solutions contained 300 and 376 parts per million, respectively, of $NaHCO_3$ and $KHCO_3$.

As shown in Table 19, two discordant results were obtained on the eighth day with the phosphate dilution water. As a rule, however, the general agreement is very satisfactory at all periods of incubation, irrespective of sewage concentration, pH adjustment, and even the nature of the added mineral salts. The experiments indicate that the substitution of synthetic dilution waters for tap waters will not lead to serious errors.

Table 19.—*Series N—Comparison of synthetic waters with Cincinnati tap water*

Dilution water used	pH value	Concentration of sewage, per cent	Period of incubation, in days: 1	3	5	8
			Oxygen demand, parts per million			
Phosphate	7.2	2	52	96	112	220
			48	102	120	152
		4	54	110	136	151
			53	112	119	195
Stored tap	7.4	2	53	110	136	166
			59	120	146	166
		4	54	112	134	138
			53	108	129	150
Do	7.7	2	50	108	140	170
			50	116	134	162
		4	52	109	131	146
			54	110	146	151
$KHCO_3$	7.8	2	42	96	140	164
			48	98	131	156
		4	58	111	135	164
			57	121	135	171
$NaHCO_3$	7.9	2	52	112	122	152
			48	100	122	162
		4	52	109	122	161
			53	110	128	154
Averages			52	100	131	162

DISCUSSION

In the experiments thus far presented, attention has been paid to factors such as the absence of mineral salts in the dilution water, the nature or concentration of the added mineral salts, and the pH value of the dilution water. As a rule, the tests were made in duplicate, at two different concentrations of sewage, and the observations were extended until the definite onset of the nitrification stage. To avoid repetition, these detailed experiments have been presented with a minimum of discussion. Consideration will now be given to certain points of agreement which are common to all experiments.

As regards agreement between duplicate determinations at any given strength of sewage and at all periods of observation, it must be concluded that, with mineralized dilution waters, the observed differences are generally within an expected experimental error of 5 parts per million. This conclusion appears warranted, irrespective of the nature or concentration of the added mineral salts and the pH value of the medium. Even with distilled water as a diluent, the agreement between strict duplicates is generally satisfactory.

If the comparison of results is extended to the average oxygen demand values obtained with different concentrations of sewage, it must be concluded that agreement within an expected experimental error of 7 or 8 parts per million has generally been observed on the first day and again after four or five days of incubation. Far greater discrepancies, however, have frequently been noted on the second or third day, the general tendency being towards lower results as the concentration of sewage is decreased. The conclusion appears warranted that these variations are to be correlated with differences of sewage concentration rather than with changes in the character of the dilution waters.

In the light of experiments conducted in this laboratory by Butterfield, Purdy, and Theriault (1930) it appears highly probable that discrepancies at intermediate periods of observation between oxygen demand results obtained with different concentrations of sewage are to be ascribed to a lag in the growth of plankton with a consequent reduction in the activity of the bacteria. As a rule the influence of the plankton is not exerted until after the first day, even with high concentrations of organic matter. The 1-day results, therefore, are not subject to variations from this source. Under favorable conditions of food supply, encysted forms of plankton present in the sewage will develop after 24 hours. In an unsuitable environment the growth of these organisms may be delayed or else the larger forms at least may fail altogether to develop.

Variations of a different type from those just considered have at times been observed in comparisons of average results obtained with

various dilution waters or with the same water at different degrees of mineralization or at different pH values. The effect in question is most strikingly shown in series F (Table 11) where, in terms of percentage error, a constant difference was observed for 30 days between results obtained with Formula C and bicarbonate dilution waters.

Explanations based on sampling errors in the preparation of the diluted sewage mixtures appear to be ruled out, although in the complicated set-ups presented in this paper occasional errors of this character can not, of course, be definitely disclaimed. It appears more probable that the observed differences were due to the use in these experiments of a sewage which, as already explained, may have contained only a limited seeding of bacteria. Under these conditions, slight variations in the environment may result in the failure to grow of the single bacterial species present which is capable of oxidizing some important element of the food supply. With the more abundant seeding furnished by ordinary sewage, several varieties of bacteria may be introduced which are capable of performing the desired oxidation under a much greater range of variation in environmental conditions.

Direct evidence on this point has been furnished by Butterfield, Purdy, and Theriault (1930), who, in work, with limited seedings of known pure cultures, have clearly shown that as the complexity of the inoculation is gradually increased, progressively larger amounts of dissolved oxygen are absorbed from solutions of dextrose and peptone. Evidence based on the use of sewage mixtures will be given in the section which follows.

THE INFLUENCE OF VARIATIONS IN SEEDING

On the theory that the relatively low results obtained with distilled water as a diluent in series A, B, and C were due to the presence in the mineralized solutions used as controls of a more varied seeding of microorganisms, an attempt was made in series O to insure the practical absence from the mineralized solutions of bacteria other than those which thrive in distilled water. Sterilized sewage was accordingly used in this series of experiments instead of raw sewage as heretofore. As an additional precaution against gross contamination, sterile bottles and siphons were used. The distilled water used singly as a diluent or with the addition of mineral salts was drawn from a common container. This distilled water had been standing in the laboratory for several days and, of course, it was not sterilized as main reliance for seeding was placed on the organisms which it normally contains. In other respects the procedure followed was substantially the same as in series A, B, and C.

As shown in Table 20, the results obtained with this limited seeding of bacteria, plankton being presumably absent, were not as consistent

as those obtained in previous experiments with mineralized dilution waters. The trend, nevertheless, is unmistakable. For the first three days the use of ordinary distilled water as a diluent led to results as good as or better than did the use of mineralized waters. It is noteworthy that on the first day no loss of dissolved oxygen occurred in bicarbonate water although, ultimately, this dilution water gave relatively high results. The virtual cessation of oxygen absorption beyond the fifth day may be credited to the absence of plankton.

TABLE 20.—*Results with a seeding of distilled water organisms*

Dilution water	Concentration of sewage, per cent	Period of incubation, in days: 1	2	3	5	7	9	10
		Oxygen demand, duplicates, parts per million						
Distilled	1	96	165	175	200	223	220	233
		97	168	178	222	260	250	-------
	2	86	145	182	191	221	201	208
		85	144	172	186	184	183	206
Phosphate	1	86	131	156	196	221	261	227
		81	134	183	261	208	244	242
	2	97	145	224	200	222	224	221
		90	161	193	220	218	225	214
Bicarbonate	1	0	166	165	230	243	252	258
		0	118	205	254	296	266	-------
	2	0	120	172	218	222	222	248
		0	120	172	212	242	238	-------
		Oxygen demand, averages, parts per million						
Distilled	1, 2	91	156	177	200	222	214	216
Phosphate	1, 2	88	143	189	219	217	238	226
Bicarbonate	1, 2	0	131	178	228	251	244	253

In other experiments use was made of a "synthetic" sewage (dextrose-peptone mixture) in which the development of very active strains of organisms had been secured by continued growth in the same medium over a period of three months. A sample of the synthetic sewage was sterilized and separate portions were then inoculated (*a*) with river water, (*b*) with fresh sewage, and (*c*) with liquor from the tank in which organisms acclimated to this synthetic sewage were growing. As shown in Table 21, the most vigorous oxidation was obtained with a seeding of tank liquor. As a control, the experiment was repeated with ordinary sewage, likewise sterilized and inoculated with the same material as before. As indicated in the lower part of Table 21, the results obtained with river water and with fresh sewage were in good agreement throughout. Distinctly lower results were obtained with a seeding of tank liquor.

The conclusion drawn from these and similar experiments is that the character of the seeding may be of much greater importance to the deoxygenation process than the nature of the mineral salts or the degree of mineralization.

TABLE 21.—*Effect of variations in seeding*

Source of sample	Nature of seeding	Period of incubation, in days			
		1	3	5	10
		Oxygen demand, parts per million			
Synthetic sewage [1]	River water	74	264	466	706
	Fresh sewage	134	262	592	670
	Tank liquor	372	720	850	882
		Oxygen demand, parts per million			
Ordinary sewage [1]	River water	62	158	206	248
	Fresh sewage	70	154	215	242
	Tank liquor	2	124	143	146

[1] Sterilized by autoclaving.

CONCLUSIONS

On the basis of the reasonably extensive series of observations presented in this paper, the conclusion appears warranted that the composition and the degree of mineralization of dilution waters for use in oxygen demand tests need not be critically adjusted, provided that the observations are restricted to the first stage of deoxygenation or to the first 8 or 10 days of incubation in work with sewage and industrial wastes.

In comparative tests and in other work where a maximum of precision is desired, especially for the first few days, consideration should be given to the character of the seeding as indicated by the presence of plankton capable of growing in highly diluted sewage and by the presence of a general infection of aerobic bacteria. As a rule these conditions will be automatically fulfilled in work with ordinary sewage. In any event, these exceptional precautions should seldom be required in the conduct of the usual 5-day oxygen demand test.

Preliminary studies of nitrification in dilute sewage mixtures have indicated that the difficulties to be surmounted are essentially those inherent in the cultivation of pure cultures. The elaborate investigations of the soil microbiologists furnish a logical point of departure in the development of dilution waters for general use in work with partly purified effluents. It appears probable, for example, that a rough measure of pH control must be envisaged. It has also been shown that nitrite formation is dependent on the presence of relatively large amounts of dissolved oxygen. Although the reason is nowhere explicitly stated, this peculiarity of the nitrifying organisms may account for the 30 to 60 per cent rule given by the Royal Commission (British) on Sewage Disposal (*cf.* Theriault, 1927, p. 22) regarding permissible limits of oxygen depletion.

In determinations of the 5-day oxygen demand of raw sewage, using ordinary distilled water as the diluent, the results obtained

have generally been 10 per cent lower than in comparative tests with mineralized dilution waters. Over shorter periods of incubation the percentage error may be considerably greater. It is to be noted, however, that in work with sewage effluents at dilutions of 1 to 5 or less, enough of mineral salts should be added along with the sample to furnish a suitable degree of mineralization. The favorable results reported by Cooper, Cooper, and Heward (1918) and others who have used distilled water in tests of sewage effluents may be due to the retardation of the nitrification process by the carbonaceous matters present in the river waters used as controls. With the development of readily prepared synthetic waters the use of distilled water for dilution purposes has become inadvisable.

In studies of the first stage of deoxygenation and with a view to the eventual development of a dilution water for general use in oxygen demand tests, it appears desirable to standardize on the readily prepared phosphate dilution water, without addition of other salts as in Formula C water. For more restricted use, particularly in the range of pH 7 to 8, it is clear, however, that the simple bicarbonate solution proposed by Mohlman and his associates may be fully as serviceable as the somewhat more complex phosphate mixtures. In this connection there is need for further information regarding the pH values reached by sewage effluents and, especially, the cultural characteristics of nitrifying organisms in the exceedingly dilute solutions encountered in sewage treatment.

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COURT DECISIONS RELATING TO PUBLIC HEALTH

Death resulting from drinking impure water held death by accident under workmen's compensation act.—(Indiana Appellate Court; State et al. *v.* Smith, 175 N. E. 146; decided Mar. 4, 1931.) An employee of the State highway commission became ill with gastroenteritis as a result of drinking some polluted water which was furnished to him while at work. Later pericarditis developed and death ensued. In a proceeding by the employee's widow under the workmen's compensation act, the appellate court affirmed the industrial board's award of compensation, holding that the death was one by accident within the meaning of the compensation law.

Silicosis resulting in tuberculosis held not an injury by accident under workmen's compensation act.—(Georgia Court of Appeals; Simmons *v.* Etowah Monument Co., 157 S. E. 260; decided Feb. 13, 1931.) An employee operated, in a closed room, an air hose through which sand

was blown on the face of marble for the purpose of wearing off the marble. A considerable amount of sand and marble dust was thus created in the room. Because of a faulty construction and adjustment of the mask which had been furnished to the employee and which he was accustomed to wear over his head to prevent the inhalation of sand and marble dust, and because of the improper and insufficient ventilation of the room, he inhaled some of the particles of sand and dust. As a consequence, the employee contracted silicosis, which resulted in tuberculosis of the lungs. In a proceeding under the workmen's compensation act a denial of compensation was affirmed by the court of appeals. The court stated that a disease was not compensable under the act unless it resulted naturally and unavoidably from an injury or "accident" which arose out of and in the course of the employment, and that the fact that the disease itself was contracted by accident, in the sense that its happening was unforeseen or unexpected, did not render it compensable if it did not result from a previous injury or accident to the employee himself. In deciding that there had been no injury by accident, the court said:

* * * Since an "injury," as defined in the compensation act, is "an injury by accident," in the sense of some damage or hurt to the employee, the mere lodging of the particles of dust and sand in the defendant's lungs constituted in itself no injury or accident to the employee in the sense of the act, other than the resulting disease itself, and the diseases of the lungs which resulted therefrom were not, for this reason, caused by any injury or accident to the employee. * * *

DEATHS DURING WEEK ENDED APRIL 18, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended April 18, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended April 18, 1931	Corresponding week, 1930
Policies in force	75, 146, 342	75, 746, 314
Number of death claims	15, 930	13, 562
Death claims per 1,000 policies in force, annual rate	11. 1	9. 3

Deaths[1] from all causes in certain large cities of the United States during the week ended April 18, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Apr. 18, 1931				Corresponding week, 1930		Death rate[2] for the first 16 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1931	1930
Total (81 cities)	8,884	13.0	797	[4] 62	12.9	750	13.9	13.3
Akron	44	8.9	6	59	11.0	8	8.7	8.8
Albany[5]	44	17.8	6	119	24.5	4	15.4	17.2
Atlanta	74	13.9	6	61	13.8	7	16.4	17.1
White	44		3	48		3		
Colored	30	([6])	3	86	([6])	4	([6])	([6])
Baltimore[5]	248	15.9	21	71	14.7	16	17.2	15.7
White	179		16	69		14		
Colored	60	([6])	5	78	([6])	2	([6])	([6])
Birmingham	88	17.0	4	40	13.6	7	15.9	14.4
White	49		2	34		2		
Colored	39	([6])	2	49	([6])	5	([6])	([6])
Boston	232	15.4	25	71	17.4	35	16.5	16.2
Bridgeport	36	12.8	4	66	10.7	2	13.0	13.8
Buffalo	156	14.0	15	61	15.9	18	15.3	14.5
Cambridge	25	11.4	1	20	10.1	0	14.0	14.0
Camden	28	12.3	5	87	12.3	5	17.9	14.9
Canton	22	10.7	1	23	15.4	5	11.2	11.6
Chicago[5]	749	11.3	79	70	10.6	58	11.9	11.7
Cincinnati	169	19.3	8	48	16.0	10	18.1	17.5
Cleveland	225	12.9	20	58	14.0	15	12.7	12.5
Columbus	73	12.9	4	39	15.6	13	15.1	15.3
Dallas	72	13.8	8		11.7	6	12.8	12.6
White	49		6			4		
Colored	23	([6])	2		([6])	2	([6])	([6])
Dayton	39	9.8	2	28	9.8	3	13.7	10.7
Denver	87	15.6	7	68	15.0	5	15.9	15.9
Des Moines	33	11.9	3	53	8.8	1	12.2	12.5
Detroit	297	9.4	43	69	10.3	41	9.7	10.6
Duluth	24	12.3	2	49	12.3	1	12.0	11.6
El Paso	31	15.4	4		13.2	5	18.3	18.4
Erie	28	12.4	4	75	10.3	2	11.7	11.2
Fall River[5][7]	22	10.0	1	23	18.5	3	13.7	14.4
Flint	26	8.3	4	51	6.9	6	7.9	10.2
Fort Worth	35	10.9	4		10.2	2	12.1	12.0
White	27		2			2		
Colored	8	([6])	2		([6])	0	([6])	([6])
Grand Rapids	42	12.8	3	44	9.9	3	9.8	11.9
Houston	73	12.3	6		10.1	1	11.8	12.9
White	47		5			1		
Colored	26	([6])	1		([6])	0	([6])	([6])
Indianapolis	101	14.2	7	58	17.3	7	15.4	16.3
White	93		7	66		7		
Colored	8	([6])	0	0	([6])	0	([6])	([6])
Jersey City	68	11.1	7	62	13.8	5	13.6	12.9
Kansas City, Kans	34	14.4	4	82	11.5	4	15.5	12.6
White	23		3	74		4		
Colored	11	([6])	1	127	([6])	0	([6])	([6])
Kansas City, Mo	115	14.7	17	129	12.5	8	15.3	14.4
Knoxville	28	13.4	5	107	14.2	0	14.3	15.5
White	18		5	119		0		
Colored	10	([6])	0	0	([6])	0	([6])	([6])
Long Beach	34	11.6	0	0	10.9	2	11.1	10.6
Los Angeles	294	11.6	28	81	10.2	15	11.7	12.1
Louisville	81	13.7	5	43	13.9	3	17.3	14.8
White	60		5	49		3		
Colored	21	([6])	0	0	([6])	0	([6])	([6])
Lowell[7]	23	11.9	2	51	16.0	4	14.6	15.0
Lynn	21	10.7	0	0	12.2	1	12.3	12.3
Memphis	101	20.4	11	116	19.7	12	18.5	18.2
White	43		6	100		6		
Colored	58	([6])	5	145	([6])	6	([6])	([6])
Miami	33	15.3	2	51	7.5	8	14.7	13.2
White	27		1	35		2		
Colored	6	([6])	1	88	([6])	1	([6])	([6])

See footnotes at end of table.

Deaths[1] from all causes in certain large cities of the United States during the week ended April 18, 1931—Continued

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Apr. 18, 1931				Corresponding week, 1930		Death rate[2] for the first 16 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1931	1930
Milwaukee	107	9.5	10	43	10.3	11	10.6	10.8
Minneapolis	106	11.7	12	77	12.5	10	12.3	11.3
Nashville	46	15.4	7	104	21.6	9	18.5	18.0
White	29		5	100		6		
Colored	17	(6)	2	118	(6)	3	(6)	(6)
New Bedford[7]	28	13.0	8	213	11.1	1	13.4	12.3
New Haven	38	12 2	3	57	15.7	1	13 6	14.5
New Orleans	140	15 6	9	49	18.9	15	19.3	19.5
White	77		5	41		13		
Colored	63	(6)	4	65	(6)	2	(6)	(6)
New York	1,686	12 4	159	66	12 2	133	13.4	12.2
Bronx Borough	230	9 0	19	43	8.3	10	9.6	8.7
Brooklyn Borough	583	11 6	59	63	10 8	43	12.4	11.3
Manhattan Borough	650	18.7	55	94	19 2	63	20.4	18.2
Queens Borough	185	8 4	24	66	7.1	17	8.6	8.0
Richmond Borough	38	12 1	2	36	17 3	0	14.2	15 3
Newark, N. J	102	11 9	5	26	14 9	18	13.7	14.1
Oakland	55	9.8	4	51	9 5	4	12.0	12.0
Oklahoma City	45	11 9	2	28	11.1	3	12.3	10.7
Omaha	46	11 1	3	34	17 3	4	14.7	14.6
Paterson	55	20.7	6	103	14.7	3	15 9	13.5
Philadelphia	553	14 7	50	73	13 0	41	15.9	14 0
Pittsburgh	226	17 4	20	69	15 9	22	17.9	15.8
Portland, Oreg	68	11 5	1	12	12 2	3	12.7	13.7
Providence	75	15 3	4	37	15 4	8	15.2	15.6
Richmond	73	20.7	7	102	14.2	4	18.1	16.4
White	43		3	66		2		
Colored	30	(6)	4	174	(6)	2	(6)	(6)
Rochester	82	12.9	8	73	15 5	10	13.9	13.2
St. Louis	247	15 0	6	20	14 1	7	18.1	15.2
St. Paul	59	11 1	6	62	10 3	2	11.7	11.2
Salt Lake City[5]	32	11 7	1	15	8.1	2	13.3	14.3
San Antonio	80	17 4	18		19 7	14	15.2	18.5
San Diego	39	13 0	3	61	15 3	6	15.5	15.6
San Francisco	160	12.8	4	27	13 3	8	14.6	13.9
Schenectady	22	11 9	1	29	13.1	2	12.0	12.2
Seattle	95	13 3	2	19	11.4	4	13.3	12.0
Somerville	23	11 4	4	149	8.5	4	11.1	12.2
South Bend	15	7 2	0	0	10 4	4	9 2	10.0
Spokane	41	18 4	3	78	17 1	1	13 6	13.7
Springfield, Mass	40	13 7	4	61	10 4	2	13.9	14 3
Syracuse	56	13 7	3	36	12 4	3	12.9	13.0
Tacoma	31	15 0	6	154	12.2	3	15 1	13.6
Toledo	69	12.2	9	83	15 6	5	13 6	14.2
Trenton	49	20 6	3	52	15 2	3	19 9	17.9
Utica	31	15 8	1	26	19 5	5	16 7	16.9
Washington, D. C	149	15.8	9	50	17.8	12	18.3	16.3
White	96		5	41		7		
Colored	53	(6)	4	69	(6)	5	(6)	(6)
Waterbury	19	9.8	1	30	9 4	1	11.3	10.9
Wilmington, Del.[7]	28	13.7	2	43	12.2	5	16.8	15.9
Worcester	58	15 3	6	82	15.7	6	15.1	15.7
Yonkers	22	8 3	0	0	11.2	1	10.1	9.3
Youngstown	33	10.0	3	42	9.2	4	11.6	11.0

[1] Deaths of nonresidents are included. Stillbirths are excluded

[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.

[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.

[4] Data for 76 cities.

[5] Deaths for week ended Friday.

[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended April 25, 1931, and April 26, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended April 25, 1931, and April 26, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Apr. 25, 1931	Week ended Apr 26, 1930	Week ended Apr. 25, 1931	Week ended Apr. 26, 1930	Week ended Apr. 25, 1931	Week ended Apr. 26, 1930	Week ended Apr. 25, 1931	Week ended Apr. 26, 1930
New England States:								
Maine	6	-------	16	6	2	30	0	0
New Hampshire	2	-------	-------	6	31	10	0	0
Vermont	-------	-------	-------	-------	1	80	0	0
Massachusetts	32	64	7	5	496	1,533	1	4
Rhode Island	9	6	1	-------	35	5	0	0
Connecticut	11	17	7	5	754	76	2	5
Middle Atlantic States:								
New York	95	143	[1] 21	[1] 47	2,367	1,898	7	12
New Jersey	59	127	8	14	930	1,360	6	7
Pennsylvania	87	102	-------	-------	4,485	1,205	10	19
East North Central States:								
Ohio	22	65	24	10	1,097	816	4	3
Indiana	34	13	21	-------	1,118	91	12	7
Illinois	77	163	5	9	1,861	794	23	12
Michigan	25	57	4	6	103	2,358	9	30
Wisconsin	12	18	77	22	729	159	2	2
West North Central States:								
Minnesota	14	8	1	2	105	272	2	3
Iowa	8	7	-------	-------	113	453	3	2
Missouri	39	32	27	12	434	108	16	9
North Dakota	1	3	-------	-------	14	26	1	2
South Dakota	4	1	-------	-------	46	110	3	1
Nebraska	6	20	-------	-------	3	531	0	0
Kansas	7	11	12	1	54	819	0	5
South Atlantic States:								
Delaware	2	-------	-------	0	168	16	0	0
Maryland [2]	14	20	16	19	1,392	68	1	2
District of Columbia	13	18	2	3	287	30	1	1
Virginia	-------	-------	-------	-------	-------	-------	-------	-------
West Virginia	10	10	17	44	67	103	2	2
North Carolina	17	19	15	25	818	24	5	5
South Carolina	14	20	703	502	109	90	2	1
Georgia	6	4	85	52	86	272	3	2
Florida	4	3	5	1	227	530	3	0
East South Central States:								
Kentucky	-------	-------	-------		128	32	3	3
Tennessee	1	5	153	43	132	347	5	29
Alabama [3]	15	10	51	63	304	148	2	2
Mississippi	4	9	-------	-------	-------	-------	0	6
West South Central States:								
Arkansas	5	5	103	31	30	68	0	7
Louisiana	19	26	19	25	3	122	4	5
Oklahoma [4]	14	5	110	20	14	451	0	2
Texas	17	29	81	26	3	193	0	0
Mountain States:								
Montana	3	3	-------	-------	7	34	2	1
Idaho	2	-------	23	-------	-------	16	2	3
Wyoming	-------	1	1	-------	1	39	0	1
Colorado	5	15	-------	-------	158	693	0	2
New Mexico	1	6	56	-------	91	58	1	1
Arizona	4	2	5	4	17	68	0	6
Utah [2]	2	4	7	6	7	298	1	2
Pacific States:								
Washington	6	7	-------	-------	30	463	3	12
Oregon	5	11	97	29	157	71	0	0
California	56	49	276	22	1,558	2,399	7	5

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, 1931, 2 cases in Alabama.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended April 25, 1931, and April 26, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Apr. 25, 1931	Week ended Apr. 26, 1930	Week ended Apr. 25, 1931	Week ended Apr. 26, 1930	Week ended Apr. 25, 1931	Week ended Apr. 26, 1930	Week ended Apr. 25, 1931	Week ended Apr. 26, 1930
New England States:								
Maine	0	1	26	24	0	0	0	4
New Hampshire	0	0	6	24	0	0	0	0
Vermont	0	0	4	11	0	12	0	0
Massachusetts	2	0	384	297	0	0	3	4
Rhode Island	0	0	77	30	0	0	0	1
Connecticut	0	0	58	80	0	0	2	1
Middle Atlantic States:								
New York	3	1	906	504	2	1	9	14
New Jersey	0	1	338	231	0	0	5	4
Pennsylvania	1	2	634	406	0	0	6	6
East North Central States:								
Ohio	0	1	367	277	43	151	4	30
Indiana	0	0	216	170	125	182	4	3
Illinois	0	0	551	473	38	150	4	5
Michigan	1	1	293	319	39	52	3	7
Wisconsin	1	1	170	187	24	17	1	1
West North Central States:								
Minnesota	0	0	87	91	5	3	0	0
Iowa	0	0	75	75	81	102	1	0
Missouri	0	0	203	99	30	88	4	2
North Dakota	0	0	8	31	2	25	0	0
South Dakota	0	0	18	30	32	45	1	0
Nebraska	0	0	26	78	24	113	0	1
Kansas	1	0	59	110	136	104	3	2
South Atlantic States:								
Delaware	0	0	20	5	0	0	0	0
Maryland [1]	0	0	71	136	0	0	0	5
District of Columbia	0	0	28	10	0	0	0	0
Virginia						7		
West Virginia	0	0	64	31	5	0	4	15
North Carolina	0	0	41	29	3	18	1	2
South Carolina	1	0	9	5	3	8	6	10
Georgia	0	0	69	21	0	0	3	6
Florida	0	0	4	3	0	0	2	2
East South Central States:								
Kentucky	0	0	49	22	14	7	1	2
Tennessee	0	0	41	65	17	10	4	12
Alabama [3]	0	0	19	9	4	9	2	2
Mississippi	1	0	14	9	51	27	3	4
West South Central States:								
Arkansas	0	0	26	4	51	8	7	4
Louisiana	0	1	23	18	36	19	9	22
Oklahoma [4]	1	0	37	55	60	145	11	3
Texas	0	0	43	42	54	87	10	9
Mountain States:								
Montana	0	0	45	38	2	13	1	4
Idaho	0	0	3	3	1	2	2	0
Wyoming	0	1	11	1	2	11	0	0
Colorado	0	0	30	22	2	4	1	0
New Mexico	0	0	4	13	1	11	5	2
Arizona	0	0	7	14	0	14	0	5
Utah [1]	1	0	10	8	0	0	1	2
Pacific States:								
Washington	0	0	23	31	23	63	4	3
Oregon	0	0	14	34	33	30	0	6
California	7	3	154	150	46	66	10	8

[1] Week ended Friday.
[3] Typhus fever, 1931, 2, cases in Alabama.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
March, 1931										
California	20	222	2,638	3	5,969		19	620	216	32
Louisiana	17	88	217	29	78	57	0	100	121	24
Maryland	1	64	549	1	4,829		0	371	0	11
Michigan	60	160	572	1	789		2	1,752	86	11
Minnesota	11	89	150		455		2	501	30	5
Missouri	47	208	540	7	1,853	1	0	1,591	213	31
North Carolina	21	104	519		2,980	73	1	219	5	5
Rhode Island	1	26	9		52		0	266	0	0
West Virginia	4	38	575		364		0	118	56	16

March, 1931

	Cases
Actinomycosis:	
California	1
Chicken pox:	
California	2,509
Louisiana	86
Maryland	683
Michigan	1,574
Minnesota	783
Missouri	448
North Carolina	718
Rhode Island	93
West Virginia	343
Diarrhea:	
Maryland	4
Dysentery:	
California (amebic)	7
California (bacillary)	5
Maryland	1
Michigan	1
Minnesota	3
Minnesota (amebic)	2
Rhode Island	1
Food poisoning:	
California	72
German measles:	
California	79
Maryland	450
North Carolina	2,843
Rhode Island	5
Granuloma, coccidioidal:	
California	1
Hookworm disease:	
Louisiana	77
Jaundice:	
California	2
Maryland	7
Impetigo contagiosa:	
Maryland	3
Leprosy:	
California	3
Louisiana	1
Maryland	1
Lethargic encephalitis.	
California	8
Maryland	2
Michigan	5
Mumps:	
California	1,492
Louisiana	10
Maryland	382
Michigan	618
Missouri	168
Rhode Island	128
Ophthalmia neonatorum.	
Maryland	1
North Carolina	2
Paratyphoid fever	
California	1
Rabies in animals:	
California	107
Louisiana	7
Maryland	1
Missouri	2
Rhode Island	1
Scabies:	
Maryland	16
Septic sore throat:	
California	5
Maryland	13
Michigan	62
Missouri	50
North Carolina	4
Rhode Island	1
Tetanus:	
California	2
Louisiana	3
Missouri	1
Trachoma:	
California	12
Missouri	20
North Carolina	2
Trichinosis:	
Maryland	2
Tularaemia:	
Louisiana	4
Minnesota	1
Typhus fever:	
North Carolina	1
Undulant fever.	
California	9
Louisiana	2
Maryland	3
Michigan	2

Undulant fever—Continued.	Cases
Minnesota	3
Missouri	6
Vincent's angina:	
Maryland	17
Whooping cough:	
California	1,211
Louisiana	23
Whooping cough—Continued.	Cases
Maryland	124
Michigan	879
Minnesota	238
Missouri	107
North Carolina	637
Rhode Island	38
West Virginia	208

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 98 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,480,000. The estimated population of the 91 cities reporting deaths is more than 31,935,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended April 18, 1931, and April 19, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	929	1,078	
98 cities	424	544	800
Measles:			
45 States	20,732	17,848	
98 cities	8,447	7,742	
Meningococcus meningitis:			
46 States	142	244	
98 cities	78	119	
Poliomyelitis:			
46 States	24	7	
Scarlet fever:			
46 States	5,449	4,635	
98 cities	2,452	1,883	1,416
Smallpox:			
46 States	1,020	1,464	
98 cities	140	173	68
Typhoid fever:			
46 States	137	190	
98 cities	30	36	32
Deaths reported			
Influenza and pneumonia:			
91 cities	1,090	988	
Smallpox:			
91 cities	0	0	

City reports for week ended April 18, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during non-epidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	3	1	0		0	0	11	2
New Hampshire:								
Concord	0	0	0		0	9	0	1
Manchester	0	0	0		0	0	0	3
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	0	0	0		0	0	0	0
Massachusetts:								
Boston	68	29	17	1	2	113	15	23
Fall River	3	2	3	1	1	7	8	2
Springfield	0	2	1		0	16	38	2
Worcester	7	4	1		0	4	12	0
Rhode Island:								
Pawtucket	2	0	0		0	0	0	1
Providence	8	7	6		0	34	9	10
Connecticut:								
Bridgeport	1	4	0		0	0	4	4
Hartford	3	4	5	1	0	56	1	9
New Haven	19	0	0		0	322	14	6
MIDDLE ATLANTIC								
New York:								
Buffalo	11	9	11	1	0	327	71	12
New York	430	250	96	13	13	1,618	98	238
Rochester	4	5	1	2	1	70	11	7
Syracuse	32	4	1		0	4	1	3
New Jersey:								
Camden	11	6	3	1	1	20	8	4
Newark	133	15	3	8	0	30	25	8
Trenton	3	3	1		0	11	3	7
Pennsylvania:								
Philadelphia	186	58	14	8	7	1,230	84	71
Pittsburgh	109	14	6	3	4	115	78	49
Reading	7	2	2		0	27	8	3
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	6	6	3		2	128	23	19
Cleveland	222	24	11	32	6	82	439	23
Columbus	15	3	0	3	2	3	2	7
Toledo	32	3	2	3	2	9	27	6
Indiana:								
Fort Wayne	2	2	3		0	24	0	6
Indianapolis	36	4	1		0	287	26	16
South Bend	1	1	1		0	2	0	1
Terre Haute	2	1	1		0	1	0	2
Illinois:								
Chicago	138	90	91	11	6	459	81	74
Springfield	8	0	1		0	150	1	4
Michigan:								
Detroit	127	41	22	4	0	87	109	33
Flint	33	2	1	2	0	5	12	2
Grand Rapids	4	1	0		0	13	2	9

City reports for week ended April 18, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	8	0	0		0	1	107	0
Madison	31	0	6			9	73	
Milwaukee	151	11	2	1	1	102	780	11
Racine	13	2	0		0	7	9	0
Superior	16	0	0		0	0	0	3
WEST NORTH CENTRAL								
Minnesota:								
Duluth	9	0	0		1	0	0	1
Minneapolis	106	11	0		5	43	220	11
St. Paul	63	7	1	2	2	24	4	7
Iowa.								
Des Moines	9	1	0			0	0	
Sioux City	18	1	0			2	10	
Waterloo	5	0	0			0	0	
Missouri.								
Kansas City	34	3	3		0	180	2	19
St. Joseph	3	0	1		0	7	0	13
St. Louis	16	34	23	6	1	43	25	19
North Dakota:								
Fargo	5	0	0		0	0	10	0
Grand Forks	0	0	0			0	0	
South Dakota.								
Aberdeen	7	1	1			4	0	
Sioux Falls	0	0	0			1	0	
Nebraska								
Omaha	30	2	3		0	1	51	10
Kansas								
Topeka	4	1	0	1	1	3	45	3
Wichita	4	1	2		0	5	1	0
SOUTH ATLANTIC								
Delaware.								
Wilmington	3	2	0		0	70	3	3
Maryland:								
Baltimore	89	22	12	3	1	1,195	28	29
Cumberland	1	0	0		0	1	0	0
Frederick	1	0	0		0	6	0	1
District of Columbia.								
Washington	33	11	17	4	3	287	0	18
Virginia.								
Lynchburg	29	1	0		0	2	0	1
Norfolk	10	1	1	1	0	344	10	2
Richmond	1	2	2		1	315	0	3
Roanoke	1	0	0		0	9	3	1
West Virginia:								
Charleston	0	0	0	1	0	1	0	3
Wheeling	31	0	0		0	0	0	3
North Carolina.								
Raleigh	20	0	0		0	94	0	2
Wilmington	0	0	0		0	0	0	1
Winston-Salem	6	0	0	1	1	60	23	5
South Carolina:								
Charleston	0	0	0	37	0	12	0	9
Columbia	3	0	0		1	0	5	2
Greenville	1	0	2		0	0	0	0
Georgia:								
Atlanta	7	2	1	32	6	27	0	10
Brunswick	1	0	0		0	0	4	1
Savannah	3	0	0	4	3	0	13	3
Florida:								
Miami	9	2	1	2	0	12	0	0
Tampa	3	1	1		0	120	1	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	1	1	1		0	37	0	8
Tennessee:								
Memphis	31	3	0		4	118	1	20
Nashville	8	1	0		1	91	0	4

City reports for week ended April 18, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
EAST SOUTH CENTRAL—continued								
Alabama:								
Birmingham	4	1	2	0	6	26	0	9
Mobile	0	0	1		1	3	0	5
Montgomery	0	0	0	2		2	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	1	0	0			1	0	
Little Rock	2	0	1		1	1	0	7
Louisiana:								
New Orleans	16	9	9	3	4	1	0	11
Shreveport	1	0	0		0	0	6	2
Oklahoma:								
Muskogee	7	0	1	5		0	4	
Texas:								
Dallas	45	5	7	6	5	1	26	13
Fort Worth	8	2	0		3	1	0	5
Galveston	1	0	0		0	7	0	3
Houston	3	4	4		1	3	0	6
San Antonio	3	3	1		2	16	1	8
MOUNTAIN								
Montana:								
Billings	3	0	0		0	1	0	1
Great Falls	9	0	0		0	0	1	0
Helena	0	0	0		0	0	0	0
Missoula	1	0	0		0	0	1	0
Idaho:								
Boise	5	0	0		0	0	0	0
Colorado:								
Denver	56	9	2		1	18	29	9
Pueblo	0	1	0		0	85	1	0
New Mexico:								
Albuquerque	5	0	0		0	0	0	1
Arizona:								
Phoenix	1	0	1		0	1	0	4
Utah:								
Salt Lake City	12	3	0		1	2	6	0
Nevada:								
Reno	0	0	0		0	0	0	8
PACIFIC								
Washington:								
Seattle	61	2	1			4	42	
Spokane	17	2	0			7	0	
Tacoma	6	1	3		0	0	2	4
Oregon:								
Portland	23	7	1	8	1	15	13	9
Salem	1	0	0		0	8	23	0
California:								
Los Angeles	73	31	13	38	2	160	20	16
Sacramento	11	2	3	1	2	8	1	3
San Francisco	77	14	2	8	0	34	11	5

City reports for week ended April 18, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths all causes
	Cases, estimated expectancy	Cases reported	Cases estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	3	5	0	0	0	3	0	0	0	7	34
New Hampshire:											
Concord	0	0	0	0	0	1	0	0	0	0	6
Manchester	2	3	0	0	0	3	0	0	0	0	12
Vermont.											
Barre	0	3	0	0	0	1	0	0	0	3	2
Burlington	0	0	0	0	0	0	0	0	0	0	17
Massachusetts:											
Boston	82	143	0	0	0	12	1	1	0	36	232
Fall River	3	10	0	0	0	0	1	0	0	7	22
Springfield	9	10	0	0	0	3	0	0	0	7	31
Worcester	8	18	0	0	0	4	1	0	0	1	58
Rhode Island:											
Pawtucket	1	9	0	0	0	0	0	0	0	0	21
Providence	12	34	0	0	0	0	0	0	0	7	75
Connecticut.											
Bridgeport	11	3	0	0	0	2	0	0	0	2	36
Hartford	5	7	0	0	0	4	0	0	0	4	54
New Haven	8	1	0	0	0	2	0	0	0	1	38
MIDDLE ATLANTIC											
New York:											
Buffalo	28	32	0	4	0	15	0	0	0	44	152
New York	320	408	0	0	0	111	9	8	2	156	1,686
Rochester	10	87	0	0	0	0	0	0	0	18	78
Syracuse	12	27	0	0	0	2	1	0	0	34	56
New Jersey:											
Camden	6	7	0	0	0	2	0	0	0	2	28
Newark	33	66	0	0	0	7	1	0	0	46	106
Trenton	4	6	0	0	0	1	0	1	0	0	49
Pennsylvania.											
Philadelphia	103	170	0	0	0	34	2	0	0	38	553
Pittsburgh	28	64	0	0	0	8	0	0	0	26	226
Reading	5	2	0	0	0	0	0	0	0	0	27
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	18	31	2	0	0	16	1	0	1	10	169
Cleveland	37	70	0	0	0	11	1	0	0	8	225
Columbus	10	2	1	0	0	3	0	0	0	4	73
Toledo	14	7	0	4	0	5	0	0	0	13	69
Indiana.											
Fort Wayne	5	0	2	6	0	0	0	0	0	0	22
Indianapolis	9	57	7	21	0	3	0	0	0	56	-------
South Bend	5	1	0	4	0	0	0	0	0	10	15
Terre Haute	2	2	1	0	0	1	0	0	0	0	17
Illinois											
Chicago	122	254	2	0	0	47	1	1	1	68	749
Springfield	2	7	1	0	0	1	0	0	0	0	22
Michigan:											
Detroit	110	132	1	0	0	25	0	1	0	89	297
Flint	12	14	1	0	0	2	0	0	0	11	26
Grand Rapids	10	9	0	0	0	1	0	1	0	19	42
Wisconsin:											
Kenosha	2	0	1	0	0	1	0	0	0	0	9
Madison	4	1	0	0	-------	-------	0	0	-------	2	-------
Milwaukee	27	25	0	0	0	4	0	1	0	24	107
Racine	4	5	0	0	0	1	0	0	0	13	16
Superior	3	1	0	0	0	0	0	0	0	1	10
WEST NORTH CENTRAL											
Minnesota:											
Duluth	7	3	0	0	0	2	0	0	0	1	34
Minneapolis	38	23	2	2	0	1	0	0	0	28	106
St. Paul	29	7	1	0	0	3	0	0	0	17	62

City reports for week ended April 18, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
WEST NORTH CENTRAL—contd.											
Iowa:											
Des Moines	10	10	2	10			0	0		0	33
Sioux City	2	8	0	1			0	0		2	
Waterloo	2	1	0	1			0	0		1	
Missouri:											
Kansas City	22	1	1	0	0	8	0	0	0	12	115
St. Joseph	3	4	0	0	0	2	0	0	0	0	34
St. Louis	36	210	2	4	0	11	2	1	0	12	247
North Dakota:											
Fargo	1	2	0	0	0	0	0	0	0	2	9
Grand Forks	0	0	0	0			0	0		0	
South Dakota:											
Aberdeen	1	0	0	0			0	0		0	
Sioux Falls	2	2	1	0			0	0		0	
Nebraska:											
Omaha	3	6	4	11	0	3	0	1	0	8	46
Kansas.											
Topeka	3	3	0	1	0	0	0	0	0	10	21
Wichita	2	3	2	28	0	0	0	0	0	3	35
SOUTH ATLANTIC											
Delaware:											
Wilmington	5	12	0	0	0	1	0	0	0	1	28
Maryland:											
Baltimore	36	41	0	0	0	21	1	1	0	29	248
Cumberland	0	2	0	0	0	0	0	0	0	0	15
Frederick	1	0	0	0	0	0	0	0	0	0	4
District of Col.:											
Washington	25	27	1	0	0	11	0	0	0	10	149
Virginia:											
Lynchburg	0	2	0	0	0	1	0	1	0	0	15
Norfolk	1	5	0	0	0	1	0	0	0	3	
Richmond	2	7	0	0	0	7	0	0	0	1	70
Roanoke	2	1	0	0	0	1	0	0	0	0	13
West Virginia:											
Charleston	0	1	1	2	0	1	0	0	0	4	19
Wheeling	2	0	0	0	0	2	0	[1] 1	0	9	23
North Carolina:											
Raleigh	0	1	1	0	0	2	0	0	0	45	8
Wilmington	0	0	0	0	0	0	0	0	0	8	6
Winston-Salem	0	0	1	0	0	0	0	0	0	10	24
South Carolina:											
Charleston	0	1	0	0	0	5	0	0	0	0	39
Columbia	0	0	0	0	0	1	1	0	0	0	19
Greenville	0	0	0	0	0	0	0	0	0	0	
Georgia:											
Atlanta	4	58	2	3	0	2	0	0	0	0	74
Brunswick	0	0	0	0	0	0	0	0	0	0	4
Savannah	0	0	1	0	0	1	0	0	0	0	31
Florida:											
Miami	0	0	0	0	0	2	1	0	0	1	33
Tampa	1	2	0	0	0	1	1	1	0	5	13
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	14	1	0	0	1	0	0	0	0	27
Tennessee:											
Memphis	9	66	1	9	0	9	1	2	0	24	101
Nashville	2	10	2	0	0	4	0	0	0	0	46
Alabama:											
Birmingham	2	10	1	0	0	4	0	0	0	4	88
Mobile	0	0	0	0	0	3	0	0	0	0	38
Montgomery	0	0	0	0			0	0		0	

[1] Nonresident.

City reports for week ended April 18, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths all causes
	Cases, estimated expectancy	Cases reported	Cases estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0			0	0		4	
Little Rock	1	5	0	0	0	7	0	0	0	0	
Louisiana:											
New Orleans	9	10	0	22	0	11	3	0	0	2	140
Shreveport	0	0	1	0	0	5	0	0	0	0	40
Oklahoma:											
Muskogee	1	0	2	0			0	0		0	
Texas:											
Dallas	4	10	2	1	0	3	1	1	0	13	72
Fort Worth	2	2	5	4	0	1	0	0	0	0	35
Galveston	0	0	0	1	0	2	0	1	0	0	15
Houston	1	6	2	4	0	3	0	0	0	0	73
San Antonio	1	2	0	0	0	10	0	0	0	0	80
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	3	7
Great Falls	1	4	0	0	0	0	0	0	0	17	3
Helena	0	3	1	0	0	0	0	0	0	0	5
Missoula	1	0	0	0	0	0	0	0	0	0	4
Idaho											
Boise	0	1	0	1	0	0	0	0	0	1	4
Colorado:											
Denver	12	22	0	0	0	7	0	0	0	34	82
Pueblo	2	0	0	0	0	1	0	1	0	4	8
New Mexico											
Albuquerque	0	0	0	0	0	2	0	0	0	0	9
Arizona.											
Phoenix	1	1	0	0	0	2	0	0	0	0	
Utah:											
Salt Lake City	2	2	0	0	0	2	0	0	0	24	32
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	6
PACIFIC											
Washington:											
Seattle	8	13	2	2			1	0		89	
Spokane	6	0	7	8			0	0		0	
Tacoma	2	1	4	0	0	1	0	0	0	8	31
Oregon											
Portland	4	4	10	8	0	0	1	0	0	2	68
Salem	0	0	1	0	0	0	0	0	0	0	
California:											
Los Angeles	32	35	5	3	0	22	1	1	1	23	294
Sacramento	2	2	0	1	0	1	0	0	0	48	25
San Francisco	22	8	1	0	0	10	1	4	0	29	143

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	1	0	0	0	0	0	0
Massachusetts:									
Boston	0	0	0	0	0	0	0	1	0
Worcester	1	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
New York	9	6	3	2	0	0	1	2	1
New Jersey:									
Newark	0	0	1	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	5	4	1	0	0	0	0	1	0
Pittsburgh	1	2	1	3	0	0	0	0	0

City reports for week ended April 18, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	0	0	1	0	0	0	0	0
Cleveland	2	1	1	0	0	0	0	0	0
Columbus	2	1	0	0	0	0	0	0	0
Indiana									
Indianapolis	2	0	0	0	0	0	0	0	0
Illinois:									
Chicago	15	8	2	2	0	0	0	0	0
Michigan:									
Detroit	5	4	1	0	0	0	0	0	0
Wisconsin.									
Racine	0	0	1	1	0	0	0	0	0
WEST NORTH CENTRAL									
Missouri:									
St. Louis	3	1	0	0	0	0	0	0	0
Nebraska:									
Omaha	1	0	0	0	0	0	0	0	0
Kansas:									
Topeka	0	0	0	0	1	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	4	2	0	0	0	0	0	1	0
District of Columbia									
Washington	5	3	0	0	0	0	0	0	0
Virginia:									
Lynchburg	0	0	0	0	0	1	0	0	0
Roanoke	0	0	0	0	0	1	0	0	0
West Virginia:									
Charleston	1	1	0	0	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	1	0	0	0	0
Wilmington	0	0	0	0	1	0	0	0	0
Winston-Salem	0	0	0	0	1	0	0	0	0
South Carolina:									
Charleston	0	0	0	0	7	1	0	0	0
Columbia	1	0	0	0	0	0	0	0	0
Georgia:									
Atlanta	0	0	0	0	1	1	0	0	0
Brunswick	0	0	0	0	0	1	0	0	0
Savannah	0	0	0	0	1	0	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	7	2	0	0	0	0	0	0	0
Nashville	1	1	0	0	0	0	0	0	0
Alabama:									
Birmingham	3	3	0	0	0	0	0	0	0
Mobile	2	0	0	0	0	0	0	0	0
Montgomery	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	1	0	0	0	0	0	0	0	0
Shreveport	0	0	0	0	0	1	0	0	0
Texas:									
Dallas	0	0	0	0	3	1	0	0	0
Fort Worth	0	0	0	0	0	1	0	0	0
MOUNTAIN									
Montana:									
Billings	1	0	0	0	0	0	0	0	0
Colorado:									
Pueblo	1	0	0	0	0	0	0	0	0
New Mexico:									
Albuquerque	0	0	0	0	0	0	0	1	0
Arizona:									
Phoenix	0	2	0	0	0	0	0	0	0
Utah.									
Salt Lake City	2	0	0	0	0	0	0	0	0
PACIFIC									
California:									
Los Angeles	2	0	0	0	1	0	0	4	0

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended April 18, 1931, compared with those for a like period ended April 19, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, March 15 to April 18, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Mar. 21, 1931	Mar. 22, 1930	Mar. 28, 1931	Mar. 29, 1930	Apr. 4, 1931	Apr. 5, 1930	Apr. 11, 1931	Apr. 12, 1930	Apr. 18, 1931	Apr. 19, 1930
98 cities	65	97	78	82	53	79	65	93	66	86
New England	67	65	70	56	46	68	84	82	79	119
Middle Atlantic	64	97	63	80	48	74	59	92	62	83
East North Central	72	132	82	111	64	107	86	115	83	96
West North Central	73	74	103	64	42	52	63	89	63	87
South Atlantic	73	90	61	70	47	64	49	80	65	64
East South Central	23	36	76	48	29	30	17	6	23	18
West South Central	71	136	64	125	85	139	54	153	74	206
Mountain	17	88	87	44	44	26	35	79	17	9
Pacific	51	45	69	34	53	51	57	51	43	36

MEASLES CASE RATES

98 cities	1,040	776	1,208	879	1,122	1,004	1,326	1,195	1,316	1,227
New England	1,527	1,030	1,479	1,117	1,108	1,449	1,503	1,562	1,349	1,629
Middle Atlantic	1,158	539	1,321	611	1,250	789	1,422	906	1,543	1,097
East North Central	559	538	723	654	727	799	831	904	790	1,074
West North Cental	492	994	650	908	532	860	704	1,199	589	1,009
South Atlantic	3,442	617	3,879	697	3,808	867	4,546	1,067	4,313	1,089
East South Central	905	1,291	1,635	968	1,501	526	1,751	329	1,612	299
West South Central	51	547	47	784	88	731	68	721	101	502
Mountain	1,288	2,890	1,140	2,987	661	4,731	844	7,674	923	6,793
Pacific	394	1,800	519	2,184	358	2,008	499	2,030	417	1,800

SCARLET FEVER CASE RATES

98 cities	388	316	402	308	371	301	362	320	382	298
New England	676	372	697	393	577	462	474	351	584	402
Middle Atlantic	392	294	454	299	401	293	413	281	415	262
East North Central	395	418	378	383	378	377	338	430	383	391
West North Central	589	335	580	308	585	271	537	309	518	368
South Atlantic	312	286	310	272	200	276	355	308	306	302
East South Central	483	179	559	233	396	143	465	132	582	143
West South Central	101	108	78	111	95	157	105	108	112	115
Mountain	305	352	209	458	157	238	174	335	278	352
Pacific	110	202	104	204	92	168	104	217	116	144

SMALLPOX CASE RATES

98 cities	21	24	17	22	14	23	19	29	22	27
New England	0	0	0	2	0	0	0	2	0	2
Middle Atlantic	0	0	0	0	0	0	1	0	2	0
East North Central	8	20	7	17	9	30	6	23	19	23
West North Central	130	97	99	99	78	87	96	149	92	139
South Atlantic	0	2	4	8	2	2	18	10	10	4
East South Central	12	6	12	18	12	0	0	12	52	18
West South Central	95	49	78	45	71	17	81	28	95	70
Mountain	9	35	44	26	0	106	17	62	9	26
Pacific	43	103	22	71	16	71	53	89	27	71

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931 and 1930, respectively.

Summary of weekly reports from cities, March 15 to April 18, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	Mar. 21, 1931	Mar. 22, 1930	Mar. 28, 1931	Mar. 29, 1930	Apr. 4, 1931	Apr. 5, 1930	Apr. 11, 1931	Apr. 12, 1930	Apr. 18, 1931	Apr. 19, 1930
98 cities	4	8	4	8	4	4	5	5	5	6
New England	2	0	2	2	2	5	2	0	2	7
Middle Atlantic	2	6	2	15	3	8	5	1	4	2
East North Central	2	1	2	3	2	2	3	1	2	2
West North Central	8	10	2	4	4	2	0	4	4	8
South Atlantic	16	14	12	6	14	4	16	22	8	22
East South Central	0	84	0	30	0	30	6	18	12	6
West South Central	10	10	7	7	10	10	3	7	7	7
Mountain	0	18	0	0	9	18	0	44	9	18
Pacific	8	10	10	2	2	6	8	4	10	8

INFLUENZA DEATH RATES

	Mar. 21, 1931	Mar. 22, 1930	Mar. 28, 1931	Mar. 29, 1930	Apr. 4, 1931	Apr. 5, 1930	Apr. 11, 1931	Apr. 12, 1930	Apr. 18, 1931	Apr. 19, 1930
91 cities	32	15	29	14	23	13	18	16	17	15
New England	19	2	14	10	2	7	19	7	7	7
Middle Atlantic	23	14	20	10	17	14	12	20	12	14
East North Central	28	9	25	11	18	10	14	8	10	12
West North Central	47	12	35	6	12	9	15	9	29	19
South Atlantic	49	28	32	16	39	8	30	26	32	22
East South Central	113	78	126	97	126	39	69	45	76	68
West South Central	35	25	55	32	69	36	45	25	45	25
Mountain	35	62	61	53	26	26	17	26	17	9
Pacific	34	7	41	2	14	0	19	12	10	2

PNEUMONIA DEATH RATES

	Mar. 21, 1931	Mar. 22, 1930	Mar. 28, 1931	Mar. 29, 1930	Apr. 4, 1931	Apr. 5, 1930	Apr. 11, 1931	Apr. 12, 1930	Apr. 18, 1931	Apr. 19, 1930
91 cities	184	161	180	163	171	161	155	164	161	149
New England	183	218	156	220	127	181	173	186	144	160
Middle Atlantic	216	159	220	187	223	184	168	185	180	180
East North Central	132	148	125	117	120	146	118	127	128	114
West North Central	215	123	171	135	150	117	253	150	244	156
South Atlantic	269	222	263	212	221	196	199	230	188	202
East South Central	208	188	189	227	170	155	176	201	290	207
West South Central	180	199	211	164	238	164	169	181	173	121
Mountain	122	194	131	176	157	185	191	185	113	167
Pacific	101	77	98	92	53	62	60	72	67	37

FOREIGN AND INSULAR

SMALLPOX ON VESSEL

Information has been received stating that the S. S. *Benvenue* arrived in Sydney, Australia, on January 14, 1931, with a case of smallpox on board. It was thought that the infection occurred in Shanghai, which was the vessel's previous port of call. The patient was placed in quarantine, the crew vaccinated, and the necessary disinfection of the ship carried out. No further cases occurred.

AUSTRALIA

Notifiable diseases—52 weeks ended December 27, 1930.—The following table gives the provisional figures for cases of notifiable infectious diseases reported in Australia during the 52 weeks ended December 27, 1930.

Disease	New South Wales	Victoria	Queensland	South Australia	West Australia	Tasmania	Federated Capital Territory
Cerebrospinal fever	43	17	3	8	2	2	----------
Diphtheria	4,043	3,225	1,807	244	1,032	570	9
Dysentery	(1)	44	5	52	26	(1)	----------
Erysipelas	(1)	(1)	119	227	1	(1)	----------
Leprosy	5	----------	2	----------	----------	----------	----------
Lethargic encephalitis	11	12	2	7	----------	1	----------
Malaria	(1)	----------	9	----------	8	1	----------
Poliomyelitis	30	86	5	15	4	129	1
Puerperal fever	263	48	41	75	18	26	1
Scarlet fever	4,394	1,985	615	104	294	476	49
Tuberculosis	1,804	1,237	339	427	547	202	2
Typhoid fever	407	140	139	79	118	26	----------
Typhus, endemic	(1)	(1)	(1)	7	50	(1)	----------

[1] Not notifiable.

CANADA

Provinces—Communicable diseases—Weeks ended April 11 and 18, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the weeks ended April 11 and 18, 1931, as follows:

WEEK ENDED APRIL 11, 1931

Province	Cerebrospinal fever	Influenza	Lethargic encephalitis	Smallpox	Typhoid fever
Prince Edward Island [1]	----------	----------	----------	----------	----------
Nova Scotia	----------	25	----------	----------	----------
New Brunswick [1]	----------	----------	----------	----------	----------
Quebec	1	2	----------	----------	13
Ontario	3	52	----------	4	3
Manitoba	----------	----------	1	----------	3
Saskatchewan	----------	----------	----------	5	----------
Alberta [1]	----------	----------	----------	----------	----------
British Columbia [1]	----------	----------	----------	----------	----------
Total	4	79	1	9	19

[1] No case of any disease included in the table was reported during the week.

WEEK ENDED APRIL 18, 1931

Province	Cerebrospinal fever	Influenza	Lethargic encephalitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia	3	2			
New Brunswick	1				1
Quebec					19
Ontario	1	1			7
Manitoba					1
Saskatchewan				16	1
Alberta	1				
British Columbia	1	11			
Total	7	14		16	29

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended April 18, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended April 18, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	101	Puerperal septicemia	1
Diphtheria	27	Scarlet fever	85
German measles	10	Tuberculosis	67
Influenza	7	Typhoid fever	19
Measles	509	Whooping cough	75
Mumps	20		

Quebec Province—Vital statistics—February, 1931.—Births, deaths, and marriages for the month of February, 1931, in the Province of Quebec, Canada, with deaths from certain specified causes, are shown in the following table:

Estimated population	2,782,500	Deaths from—Continued	
Births	5,951	Measles	14
Birth rate per 1,000 population	27 9	Nephritis	167
Deaths	2,990	Pneumonia	385
Death rate per 1,000 population	14 0	Poliomyelitis	2
Marriages	939	Puerperal state	31
Deaths under 1 year	786	Scarlet fever	14
Deaths under 1 year per 1,000 births	132.1	Syphilis	17
Deaths from—		Traffic	10
Cancer	188	Tuberculosis (pulmonary)	211
Diabetes	22	Tuberculosis (all other forms)	60
Diarrhea	113	Typhoid fever	12
Diphtheria	32	Violence	53
Heart disease	315	Whooping cough	42
Influenza	242		

CHINA

Meningitis.—During the week ended April 4, 1931, 17 deaths from cerebrospinal meningitis were reported in Shanghai, China. During the week ended April 11, 1 case of meningitis was reported in Hong Kong, and 5 cases in Canton.

COLOMBIA

Influenza—Bogota.—According to a report dated April 9, 1931, there was a widespread influenza epidemic in Bogota, Colombia. Few deaths had occurred. A large proportion of the population of the city was said to be affected.

YUGOSLAVIA

Communicable diseases—March, 1931.—During the month of March, 1931, certain communicable diseases were reported in Yugoslavia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	19	3	Paratyphoid fever	2	
Cerebrospinal meningitis	23	13	Puerperal sepsis	4	3
Diphtheria and croup	609	77	Rabies	1	1
Dysentery	23	3	Scarlet fever	529	86
Erysipelas	179	7	Tetanus	12	3
Lethargic encephalitis	1	1	Typhoid fever	109	19
Measles	1,545	34	Typhus fever	10	1

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931			February, 1931				March, 1931				April, 1931			
					17	24	31	7	14	21	28	7	14	21	28	4	11	18	25
Ceylon: Colombo	C												1						
China.																			
Canton	C	1															1		
Shanghai	C	2																	
India	C	18,944	11,112	10,687	3,504	4,022	4,275	3,533	3,529	2,549									
	D	9,782	5,933	5,689	1,770	2,165	2,231	1,957	1,846	1,325									
Bombay	C	19	13		20	1											2		
	D	17	7		6	3											1		
Calcutta	C	33	22	28	36	29	24	32	27	33	45	65	80	102	123	125	95		
	D	16	16	20	25	19	19	23	22	25	26	39	49	68	69	70	55		
Karikal	C			1					4		1	4	2	1	7	2			
	D								4			4	2	1	7	2			
Madras	C	1		201	47	36	16		18	20	19	15	4	5	7	4			
	D			67	21	11	7	8	5	4	14	6	5	3	2				
Negapatam	D						1	2	1		2								
Rangoon	C			1															
	D			1	1														
Tuticorin	C	1	5	1	1					1									
	D	1																	
India (French):																			
Chandernagor	C	1	1	2			1			1	2	2	2	2	2				
	D			3			1			1	3	1	2	3	1				
Pondicherry	C	1	4	31	9	4	3	3	10	20	31	39	29	25	26	20	5		
	D		4	21	3	3	3	2	10	9	6	9	6	5	4	3	1		
India (Portuguese)	C	14		1															
	D	9																	
Indo-China (see also table below):																			
Pnompenh	C	1	2			1	2	1		3	3	3					1		
	D		2				2			1	2	2		1					
Saigon and Cholon	C	1	3	9	4	1		1			3	1	1		1	3	2		
	D		1	4	2	1					3	1	2	1	1	1			

Philippine Islands:[1]																			
Ports—Iloilo	C		1	1			2												
	D		3	1			2												
Provinces—																			
Capiz	C						3	56	69	54	28	35	29	11	4	4		3	8
	D						2	45	55	39	23	29	24	10	4	3		3	8
Iloilo	C	30	45	28	11	41	36	57	27	42	10	16	2	5					
	D	23	27	22	9	27	25	49	21	22	11	11	2	2					
Masbate	C												21						
	D												9						
Negros, Occidental	C	56	163	120	19	32	33	6	1	1	2								
	D	41	123	97	15	17	19	5	1	1	2								
Negros, Oriental	C							1											
	D							1											
Samar	C	16	8	17															
	D	12	8	9															
Sorsogon	C	5																	
	D	4																	
Siam	C	4	6	2	2		1			1				4	4	2			
	D	4	6	2	1									1	1				
Ayudhaya District	C															1			
Bangkok	C	3	4	2	2		1		1			1		1	1		1		
	D	2	4	2	1							1		1	1				
Bisnulok Province	C													4	4				
	D													1	1				

[1] Figures for cholera in the Philippine Islands are subject to correction

Place		September, 1930	October, 1930	November, 1930	December, 1930			January, 1931			February, 1931			March, 1931		
					1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-28	1-10	11-20	21-31
Indo-China (French) (see also table above):																
Cambodia [1]	C	38	22	26	28			7	19	36		35				65
Cochin-China [1]	C	33	28	13	8			7	4	13		5				33

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931 17	24	31	February, 1931 7	14	21	28	March, 1931 7	14	21	28	April, 1931 4	11	18
Algeria:																		
Algiers	C	11	2	1	1		1		1							1		
	D	3														1		
Bone	C						1											
Constantine, vicinity of	C	1		50			1		1									
	D						1											
Oran	C	2																
	D	1																
Plague-infected rats		1																
Philippeville	C	2		1														
	D			1														
Argentina:																		
Cordoba Province	C					1				2								
Entre Rios Province—Diamante	C										2							
Jujuy Province—Palpala	C						1			1								
Santa Fe	C									2								
Belgian Congo	C	1	1											2				
	D	1	1											2				
British East Africa (see also table below):																		
Tanganyika	C		3	2							15	7						
	D		3	2							4							
Uganda	C	171	111	67	7	8	2	8	6	4								
	D	168	112	67	6	8	2	8	6	4								
Ceylon: Colombo	C	1	9	9	1	1	1	5	6	2	1	2	1	3	3	1	1	
	D	1	8	9		1	1	4	7	2	1	3	1	3	2	1	1	
Plague-infected rats		1	2				1	1	1	1	1			3	1			
China: Shensi	C	1																
Dutch East Indies:																		
Batavia and West Java	C	143	208	239	56	57	37	30	29	36	46	30	18					
	D	146	206	238	54	53	37	24	29	35	46	28	17					
East Java and Madura	C							4			1							
	D							4			1							
Java and Madura	D	501	557	615	142	102	98	65	89	100	90	80	88	91				

Egypt:																		
Alexandria	C	7	4	3				1	1			1	1					
	D	7	1															
Plague-infected rats			3	1		1				1								
Assiout	C	3	9	7	2	19	2	3	9		17	15	6	10	1	1	5	16
	D	1	1	1	2	2	2		4		3	4		4	1	1		11
Aswan	C		3															
Beni-Suef	C				1													
	D				1													
Cairo	C															1		
Deirout	C					19	2		6	10								
	D					2	2			4								
Gharbieh	C						1											
	D						1											
Girga	C			7				1						14	37	35	31	9
	D			2				1						2	5	17	13	8
Kena	C														5			
	D														2			
Manfalut	C			23	5	21	4		11		2	2	3	5	9			
	D			5	2	3	1		4		1			2	1			
Minieh	C		1			1	1							2	1			
	D						1							1	1			
Port Said	C	2																
France: Marseille	C	4																
Greece (see table below).																		
India	C	2,721	3,259	3,740	1,169	1,279	1,438	1,449	1,270	1,095								
	D	1,497	1,856	2,226	837	737	977	891	882	774								
Bassein	C	1		2	1		1	2				1						
	D			1	1			2	1									
Bombay	C	1				1			1				1	1	1	1	4	
	D	1				1			1					2	1		4	
Plague-infected rats		30	32	38	10	6	9	9	14		8	10	17	14	21	18	34	
Madras Presidency	C	185	148	220	73	99	75	65	30	19	13	12						
	D	124	78	154	47	58	39	43	17	18	7	4						
Rangoon	C	2		2		2									1		1	
	D	1		1		1									1		1	
Plague-infected rats		1	4	2	2	1	1			6						1	1	
India (Portuguese)	C	3																
	D	3																
Indo-China (see also table below). Pnompenh	C		6	1	1	3	2	1				1						
	D	1	6	1	1	3	2	1		1	2	1	2	1	1	2	2	
Iraq: Baghdad	C	P	4			2	3				1	2	1	3	3	1		5
	D		2			2	2					2		3	1	1		2
Madagascar (see also table below) Tamatave	C	5	4	2		5	4											
	D	3	3															
Morocco	C	5		19	13													
	D			8	4													
Nigeria: Lagos	C	38	9	5				1									2	
	D	5	9	5				1									2	
Plague-infected rats		13	5	5														
Peru (see table below).																		
Senegal (see table below).																		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931 17	24	31	February, 1931 7	14	21	28	March, 1931 7	14	21	28	April, 1931 4	11	18
Siam	C	6						4	5	9	3	1	2	2				
	D	5						2	4	6	4		1	1				
Bangkok	C	1	1	3		4	4		1	2	3		29					
	D	1	1	3		4	3	1		1	4		6					
Nagara Rajsima	C	1	11	17	3	2	1	3	7						1			
	D	1	9	10	2	3	1	4	6									
Syria: Beirut	C	6		1				1		1								
Tripolitania	C	1	13		2	2	1	3		1			1					
	D		1		2			1										
Tunisia: Tunis	C	1	P	13	1					9	2	3		5		5	5	
	D									7						4	4	
Union of Socialist Soviet Republics:																		
Gouranduz	D						28											
Transcaucasia—Karabakh	C					6												
Union of South Africa:																		
Cape Province	C	1	P															
Orange Free State	C			2				P	P	1	P		2					
	D			2						1								
On vessel: S. S. Marionga de Thermiotis at Avonmouth	C			1														

Place		Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931
British East Africa (see also table above):							
Kenya	C	87	53	58	62	50	69
Greece	C			2			
Indo-China (see also table above)	C	2	5	2	5	1	
Madagascar (see also table above):							
Ambositra Province	C			4	44	95	100
	D			4	44	87	96
Antsirabe Province	C	11	21	3	18	27	66
	D	11	21	3	18	26	57

Place		Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931
Peru	C	21	10	42	34	8	
	D	8	2	20	14		
Senegal:							
Baol [1]	C	79	48	53			
	D	20	23	35	4		
Dakar [1]	C	108	3				
	D	90	8				
Louga [1]	C	75	61	37	10		
	D	33	30	25	3		

Miarinarivo Province	C	2	7	18	12	18	28	Thies [1]	C	34	12	24	27	2	
	D	2	7	18	12	18	26		D	20	4	15	23	1	
Moramanga Province	C	27	18	20	19	13	7	Tivaouane [1]	C	110	20	53	31	2	
	D	27	17	20	19	11	5		D	54	14	31	25	1	
Tananarive Province	C	39	79	125	170	178	92								
	D	38	79	116	164	172	69								

[1] Reports incomplete.

SMALLPOX

[C indicates cases, D, deaths; P, present]

Place		Oct. 19–Nov 15, 1930	Nov 16–Dec 13, 1930	Dec. 14, 1930–Jan 10, 1931	Week ended— January, 1931: 17	24	31	February, 1931: 7	14	21	28	March, 1931: 7	14	21	28	April, 1931: 4	11	18
Algeria:																		
Algiers	C			1				1		1					2			
Bone	C						1											
Constantine	C	1												1				
Oran	C		3															
Arabia: Aden	C							1	1									
Belgian Congo	C			79	27	23												
Belgium	C								1									
Brazil.																		
Porto Alegre (alastrim)	C	28	36			3			1	1	2	3	7					
Rio de Janeiro	C	2																
British East Africa (see also table below): Tanganyika	C	17	385	84	21	25	18	6	35	12	13	1						
	D	1	36	4	1	1	2	1		12	1							
British South Africa: Southern Rhodesia	C	95	18	18	2	1												
	D		3															
Canada:																		
Alberta	C		1	19		7			1									
British Columbia—Vancouver	C	3	1	3				2	1	2	5							
Manitoba	C						1				1							
Winnipeg	C			1							1							
Nova Scotia	C						1								1			
Ontario	C	59	23	17	10	3	32	4	10	4	7	8	2	3	3	1	4	
Kingston	C			6	1					1								
North Bay	C			2					1									
Ottawa	C	37	12	2	1	1	1			1								
Sault Ste. Marie	C			1	11	8	5	6			2						3	1
Toronto	C		4										1		1		3	
Quebec	C		2			2												
Saskatchewan	C	2	18		7	6	5	20	17	18	18	10	40	10	8		5	16
Regina	C									1					2			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931			February, 1931				March, 1931				April, 1931		
					17	24	31	7	14	21	28	7	14	21	28	4	11	18
Canary Islands: Las Palmas	C														1			
China:																		
Canton	C								2			1	1	2	2	2	1	
Chungking	C	P	P	2														
Foochow	C	P	P	P		P		P		P		P		P				
Hong Kong	C			1		1			2	5		2			1	1		
	D								1	1	1				2			
Manchuria—																		
Harbin	C	1					1				1							
Kwantung—Dairen	C		4	1											2			
	D		1															
Nanking	C	P	P	P	P		P	P	P	P	P	P		P	P			
Shanghai—																		
Foreigners only	C	2	8	14	1	1	6	4	4	7	2	3	3	1	1	1	2	
Including natives	D	1	4	11	2	4	4	3	5	2	4	3	5	2	2	1	2	
Swatow	D	3	3	5	1	1	3	2		3	8	7	3	6	9	8	8	
Tientsin	C	1	2		1													
Chosen (see table below).																		
Colombia: Cali	D		1															
Dutch East Indies:																		
Java—Batavia and West Java	C	26	6	4		28		1		2			1					
	D	4	2	2		1		1	1									
Sanggi Islands	C	29																
	D	3																
France (see table below).																		
Great Britain:																		
England and Wales	C	372	506	665	187	272	286	213	221	50	247	227	171	219	226	179		
Bradford	C	1	1	1		1		3		1				1				
Leeds	C	2		2												1		
London	C	172	184	161	45	47	33	24	23	16	23	36	26	54	32	35		
London and Great Towns	C	296	433	560	154	168	194	147	150	166	189	158	117	154	166	117		
	D	1	1							1								
Sheffield	C					1	1	1		16	6	10	2	1	6	1		
Stoke-on-Trent	C	1				1						1						

Greece (see table below).																		
Honduras:																		
Amapala	C											1						
Ocotopeque and Gracias districts	C											P						
Puerto Castilla	C			4	7	1		3	3									
Tela	C																1	
India	C	2,412	3,627	5,623	2,038	2,396	2,477	2,682	2,996	2,766								
	D	606	874	1,381	497	486	523	739	665	620								
Bombay	C		1	2	2	2	2	1		1	3	2	4	1	4	1	2	
	D		1	2			1			1	1	1		1	2	1	1	
Calcutta	C	9	18	59	28	28	40	47	35	51	83	82	53	69	75	86	101	
	D	7	11	40	16	22	29	33	26	41	66	55	36	54	50	63	78	
Cochin	C	25	22	15	5	6	8	10	19		16	24	15	17	14		10	
	D	3	4	1					1		1	1						
Karachi	C		3				2	1			4			3				
	D		1				1	1							2			
Madras	C	9	20	4	4	7	3	2	4	1	3	1	6	3	9	4	12	
	D	2	3							1				2	1		2	
Moulmein	C					2												
Negapatam	C	9	6														1	
Rangoon	C	1	1						2		1	1	1	1	1		2	
	D	1											1					
Vizagapatam	C							1			8		1		1		2	
	D										2				1		1	
India (French):																		
Chandernagor	C	3		5	3	2	1	3	2		6	6	3	3	6	2		
	D	1		3	1						1					2		
Karikal	C			3	1	2		2	2		16	1			1			
	D			2		2		2	2		16							
Pondicherry Province	C	11	19	34	16	8	13	8	1	1	10	7	7		4		3	
	D	11	17	32	16	8	13	8	1	1	10	7	7		4		3	
India (Portuguese)	C			4	1	4			2	3	6	3						
	D								2		1							
Indo-China (see also table below):																		
Pnompenh	C		1	2				1					1					
	D		1					1										
Saigon and Cholon	C	2	2		3	1		2		2	2		4	1	1		1	
	D	2	2		2			2			1		3	1	2	2	1	
Iraq:																		
Baghdad	C										3	6						
Mosul Liwa	C	6	16	1		2		1		5								
	D		2							1								
Ivory Coast (see table below).																		
Japan:																		
Kobe	C										1	1						
Taiwan	C							1										
Mexico (see also table below):																		
Jalisco (State)—Guadalajara	D	3	3			1									1			
Juarez	D	1																
Mexico City and surrounding territory	C	9	6	10					7	5		11	13	13	7		17	
	D	2	6	6				1	1	3	2	2	5	5	6	6	4	
Vera Cruz	C	1							1		1	1		1	1			1

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931: 17	24	31	February, 1931: 7	14	21	28	March, 1931: 7	14	21	28	April, 1931: 4	11	18
Morocco (see table below)																		
Nicaragua: Porto Cabezas	C			2														
Nigeria: Lagos	C														2			
Panama Canal Zone	C						2											
Poland	C	8	3	25						1								
Portugal: Lisbon	C	20	37	72	27	31	15	30		12	19	9	16	15	17	4	8	
Siam	C			1	1	1	1	1	1	1								
Somaliland, British: Boales	C	1	1															
	D			1														
Spain	C	51	67	68			10	8	10	4	10	46	45	15	21	22		
Straits Settlements	C	10	17	6	3	1	2	1			2				2	1	1	
	D	2	7	3			1				1				1		1	
Sudan (Anglo-Egyptian)	C	5	50	64	1	7		3	1	1	44	51	3	1	4			
	D	1	5	6		7					6	4		1	1			
Sudan (French) (see table below).																		
Syria (see table below).																		
Tunisia: Tunis	C			17	6	1	1								4			
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P				P				P						
Orange Free State	C	2	P					P			P	P			P			
Transvaal	C	P	P	P	P	P	P	P	P	P	P	P	P					
Upper Volta	C		6	4						8	10				3			
	D			2											1			
On vessel:																		
S. S. Clan Mactoggart at Suez	C								2									
S. S. Muncaster Castle at Manila from Hong Kong	C			1														
S. S. Matheran at Suez from Calcutta	C					1												
S. S. Clan Buchanan at Suez	C										2							
S. S. Rotterdam at Naples from Venice	C														1			
S. S. Clan McTavish at Manila from Chittagong	C																	1
S. S. Benvenue at Sydney from Shanghai	C				1													

Place		September, 1930	October, 1930	November, 1930	December, 1930			January, 1931			February, 1931			March, 1931		
					1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-28	1-10	11-20	21-31
Indo-China (see also table above)	C	192	258	86	38	9	14		48	46		46				139
Ivory Coast	C		4	2	9											
Sudan (French)	C	P	17		43		96							4		P
	D		2		16		4									
Syria. Beirut	C								1							

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
British East Africa (see also table above):							
Kenya	C	186		424		653	
Chosen	C	65	35	3	22		
	D	21	15	5	6		
France	C	1					
Greece	C	1	6				4
Mexico (see also table above)	D	659	718	822	893		1
Morocco	C	3	8	4	4	20	25
Turkey	C	51	21	19	74	65	116
	D	13	4	2	1	1	9

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Oct. 19-Nov. 15, 1930	Nov. 16-Dec. 13, 1930	Dec. 14, 1930-Jan. 10, 1931	Week ended—														
					January, 1931			February, 1931				March, 1931				April, 1931		
					17	24	31	7	14	21	28	7	14	21	28	4	11	18
Algeria:																		
Algiers	C	1	2						1	1					3			
Constantine Department	C	1	2	6		6	6	19			4			1		2	2	
Oran	C		5			1	2					1						
Australia; western	C															1		
Bulgaria	C	3	11	3	9	2	1	1		2		3				9		
	D			1												2		
Chile: Valparaiso	D													1				
China																		
Canton	C					2							1					
Manchuria—Harbin (see also table below)	C		1			3												
Shanghai	C					2												
Tientsin	C		1															

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931			February, 1931				March, 1931				April, 1931		
					17	24	31	7	14	21	28	7	14	21	28	4	11	18
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt.																		
Alexandria	C	2	2															1
	D	2																
Beheira Province	C			1													3	
	D			1													2	
Cairo	C		1	1				1										
Port Said	C	2				1												
Eritrea: Asmara	C												1					
Great Britain: Scotland	C							1										
Glasgow	C						2											
	D						1											
Greece (see table below).																		
Guatemala.[1]																		
Iraq: Baghdad	C								2	1	1	1	1					
	D								1									
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico (see also table below):																		
Durango	D						1										1	
Mexico City, including municipalities in Federal District	C	11	14	12	13	12	6	8	13	13	9		46	66	73	31	67	
	D	4	7	10	8	9	9	8	4	7	5		20	13	31	20	18	
San Luis Potosi	D		2						2	2		1	1	1	2		1	2
Morocco	C	3	1	8			6	2	7	8	5	8	2	2	3			
	D					2				1								
Palestine	C	3	7	4	1	1			3				2	1	1	1	1	
Paraguay: Asuncion	D					2	2											
Poland	C	37	42	63	19	21	16	30	49	41	43	56	62	58	85	82	93	
	D		7	3	2	1	4	1	3	3	4	9	4		7	4	8	
Portugal: Oporto	C	4	6			1												
Rumania	C	41	34	113	54	43	51	45	49	53	12	38	55					
	D	2	3	5	1	7	6	2	5	11	3	5	4					
Spain	C	4	1															
	D		1															

Tunisia:																		
Sbeitla, vicinity of	C															20		
	D															7		
Sfax	C														2			
Tunis	C		28			7	4	5			6	12	5	2	7		2	
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	1					
Municipality of East London	C	1	1	3		1	1	1										
Natal	C	P		P	P	P	P	P	P	P				1				
Orange Free State	C	P		P	P	P	P	P	P		P	P	P					
Transvaal	C	P	P	P	P	P	P	P	P	P	P	P	P					
Yugoslavia (see table below).																		

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reports an unusual outbreak of typhus fever in a small village in Guatemala.

Place		Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931
China: Harbin (see also table above)	C		3				
Chosen: Seoul	C	1	7	1	1	1	
Czechoslovakia	C			16	24	60	
Greece	C	4	4	4	10	10	17
Latvia	C	2					
Lithuania	C	24	1	5	6	26	8
	D	2		1	3	3	1
Mexico (see also table above)	D	47	47				
Turkey	C		28	3	2		18
Yugoslavia	C		2	2		20	
	D		1			2	

YELLOW FEVER

	Cases	Deaths
Brazil		
Bahia State—		
Mar. 14, 1931	1	
Mar. 15-21, 1931	1	
Ceara State—Mar. 14, 1931	2	
Barbalha, Feb. 7, 1931	1	1
Minas Geraes State—		
Mar. 20, 1931	2	
Apr. 5-11, 1931	1	
Rio de Janeiro State—		
Mar. 7, 1931	1	1
Mar. 14, 1931	1	1
Mar. 21, 1931	1	1
Brazil—Continued		
Rio de Janeiro State—Continued		
Cambucy—	3	3
Jan. 1-25, 1931	1	1
Feb. 1-7, 1931	1	
Friburgo (imported), Jan. 25-30, 1931		
Padua—	1	1
Jan. 18-24, 1931	1	1
Feb. 1-7, 1931	1	
Feb. 8-14, 1931		

PUBLIC HEALTH REPORTS

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CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES[1]

March 29-April 25, 1931

The prevalence of certain important communicable diseases, as indicated by weekly telegraphic reports from State health departments to the Public Health Service, is summarized in this report. The underlying statistical data are published weekly in the PUBLIC HEALTH REPORTS under the section entitled "Prevalence of Disease."

Influenza.—The increased prevalence of influenza, which first became suddenly perceptible in January in New York City and other North Atlantic sections, had largely declined on the east coast and the Great Lakes section when the outbreak appeared in the Southern Mississippi Basin and in the West, and recovery in those sections has been correspondingly slow. Thus, whereas on the North Atlantic coast the current period showed only about 63 per cent as many cases (261) as occurred during the same period last year, the incidence in the Mountain and Pacific groups (1,387 cases) was 4.8 times that of last year.

The current incidence for the reporting States as a whole (12,011 cases) exceeded last year's figure for the period by 81 per cent.

Scarlet fever.—For the reporting States combined the incidence of scarlet fever (22,210 cases) for the current period is about 13 per cent higher than that of last year. In general the excess seems greater along the Atlantic coast than elsewhere. The North Atlantic group show an excess of 29 per cent and the South Atlantic 17 per cent over last year.

Smallpox.—The total reported incidence of smallpox (4,068 cases) was 64 per cent of last year's figure and was slightly lower than that of 1929. The South Central group, however, showed a 30 per cent excess over last year; the eight States comprising this group reported 1,267 cases. By way of contrast, the nine States in the South Atlantic group reported only 56 cases.

Meningococcus meningitis.—The recorded incidence of meningococcus meningitis, 612 cases, was 55 per cent of that of last year during

[1] From the Office of Statistical Investigations, U. S. Public Health Service. The number of States included for the various diseases are as follows: Typhoid fever, 47; poliomyelitis, 48; meningococcus meningitis, 48; smallpox, 48; measles, 45; diphtheria, 47; scarlet fever, 47; influenza, 39 States and New York City. The District of Columbia is counted as a State in these reports.

the corresponding period. All regions were low in relation to last year, except the South Atlantic, where there were 64 cases as compared with 62 last year. In Maryland 14 cases were reported, as compared with 4 during the preceding 4-week period. In Illinois also there was an increase from 50 cases last period to 92 cases during the current period.

Diphtheria.—The steady decline in the reported incidence of diphtheria continues. For the reporting States as a whole 3,478 cases were reported, or about 76 per cent of last year's number for the corresponding period. Most sections show approximately this rate of decline, and none equaled last year's incidence.

Typhoid fever.—The recent incidence of typhoid fever is somewhat below that of recent years, viz, 513 reported cases during the current period, as against 663 for the period last year and 801 in 1929. All regions are low in relation to last year except the Mountain and Pacific.

Poliomyelitis.—Recovery from the epidemic increase of last autumn in the incidence of poliomyelitis continues in the slow and somewhat irregular fashion characteristic of this disease. The reported incidence for all reporting States (83 cases) was about 30 per cent in excess of reports for this season during each of the preceding two years. The situation appears to be the most favorable in the South.

Measles.—This disease appears to be somewhat epidemic along the Atlantic coast and in the Great Lakes region, particularly in the South Atlantic section, where the reported incidence is about four times that of last year.

Mortality, all causes.—The mortality from all causes in large cities, as reported by the Bureau of the Census, was exceptionally low, viz, 12.9 per thousand population, annual basis. The average of the last five years was 14.3.

PUBLIC HEALTH PROGRESS IN KNOXVILLE, TENN.

By Joseph W. Mountin, *Surgeon, United States Public Health Service*

CONTENTS

Introduction.
Part I. Prevention of illness and promotion of health.
Part II. Care of the sick
Part III. Selected welfare activities.
Summary and major recommendations.

Introduction

SCOPE AND PURPOSE OF STUDY

The practice of public-health administration is becoming more exact. Methods have been developed which, when applied properly, give returns that can be measured in relation to the local problem and in comparison with accomplishments in other communities of similar circumstances.

In the development and execution of a public-health program there are three successive steps: (1) Analysis of problem, (2) projection of a plan, and (3) periodic review or check of progress. The periodic check of progress should take into account changes in local conditions and advances in practice of public health administration, as well as the extent to which the local health department has measured up to its responsibilities.

The city of Knoxville has followed the practice outlined above. In 1923 a survey was made by Surgeon Carroll Fox of the United States Public Health Service. At that time he projected a plan which to a great extent forms the framework of the present health organization. A formal check of progress was made in 1924 by Dr. W. S. Rankin and again in 1926 by Dr. C. St. Clair Drake, both of the American Public Health Association. Each time certain changes in the program were suggested. An interim check was made by the city health officer.

The study herein reported was made in response to a request initiated by the city manager and the city health officer, and approved by the several local agencies participating in public health and related activities. The purposes of this study were (1) to check the progress made since the plan was originally projected and (2) to assist in adapting the future program to contemplated changes in personnel and plan of organization.

In conducting the study a special effort was made to determine the quantity and quality of the work being performed, and the efficiency and adequacy of the several elements of the organization. Particular attention was given to those agencies supported in whole or in part by public funds, and whose work for the most part is devoted either to the protection of the public health or the care of beneficiaries of the treatment facilities supplied by the city. Other agencies participating in or bearing a relationship to these functions were reviewed in less detail and mainly for the purpose of determining the extent to which the city could rely upon them for the performance of essential services.

COLLECTION AND PRESENTATION OF DATA

The material submitted in this report and the conclusions drawn are based upon the records of the agencies involved. In a few instances it was necessary to resort to estimates, but these estimates are based upon some recorded information. The calendar year 1929 was used for statistics of births, deaths, and communicable diseases. The reports of activities cover the nearest completed fiscal year of the organization under consideration. The fiscal year for the city is October 1 to September 30; for the schools, July 1 to June 30; and for the nonofficial agencies it is quite variable, although the calendar year is generally followed.

The report has been prepared in two main sections: (1) Prevention of Illness and Promotion of Health; and (2) Care of the Sick. Very brief consideration is given to selected welfare activities. The "Summary of Findings and Major Recommendations" concludes the report. The section on "Prevention of Illness and Promotion of Health" deals with such activities as have for their purpose the institution and application of measures which tend to prevent illness, or otherwise maintain the individual at the maximum level of efficiency and well-being. The section on "Care of the Sick" deals with those public measures and institutions which have been established for the treatment of the sick in homes, in hospitals, and in out-patient departments of hospitals. It is not possible to estimate the services rendered by physicians and dentists in their private capacity; and only such reference is made to private hospitals as will complete the picture of community service. No attempt was made to cover the field of general welfare, but rather the subject is considered in a broad way, and particularly in its relationship to the various phases of prevention and treatment of illness. In all instances, activities having a bearing on health are interpreted in terms of their suitability to the needs of the community, and recommendations are made with the same thought in mind.

GENERAL DESCRIPTION OF KNOXVILLE

The city of Knoxville is located in the center of the Great Valley of East Tennessee, on the Tennessee River about four miles below the confluence of the Holston and the French Broad Rivers, which form the Tennessee River. The first settlement on the present site of Knoxville was established in 1786 and was known as White's Fort. The city proper, however, was founded in 1791 and was incorporated by the State legislature of Tennessee in 1815. Knoxville was the capital of the "Territory of the United States South of the Ohio River" until 1796, when the State of Tennessee was organized; then it became the capital of Tennessee and remained so until 1811. From time to time changes in the city boundaries were made and adjacent towns were included. The last great change in boundaries, however, was made in 1917, when the area was increased from 3.97 to 26.24 square miles, thus including practically all the built-up surrounding sections and much unimproved land. At the present time approximately 50 per cent of the area of the city is classed as unimproved land.

Population.—The population of Knoxville, according to the census of April 1, 1930, was 105,795. The data on composition and character of the population compiled in the 1930 census are not available. The racial distribution of the population, according to the 1920 census, was as follows: Native white, 84.5 per cent; colored, 14.5 per cent; foreign born, 1.0 per cent.

Age distribution of population

[1920 United States Census]

	Knoxville	United States urban population		Knoxville	United States urban population
	Per cent	*Per cent*		*Per cent*	*Per cent*
Under 5	10.0	9.7	15 to 19	9.9	50.9
5 to 9	10.1	17.9	20 to 44	42.0	
10 to 14	9.6		45 and over	18.3	21.3

The growth of population since 1820

1820	2,000	1910	36,346
1850	2,076	1920	77,818
1880	9,693	1930	105,795

Resources.—There are approximately 350 manufacturing plants whose products in 1928 were valued at $91,806,000.00, and which give employment to 18,000 people. There are 135 wholesale and jobbing houses doing an annual business of $100,000,000.00. The principal products of the industries are cotton cloth and garments, marble, wood products, machinery, flour and feed. The area surrounding Knoxville contains many fertile farms, a diversity of mineral deposits, forests, and abundant water power resources. Smoky Mountain National Park is but a short distance from Knoxville. The University of Tennessee, with all its departments except those of medicine, dentistry, and pharmacy, is located in Knoxville. The enrollment during the regular scholastic year averages around 2,500 students.

Plan of government.—The city was incorporated in 1815. It was governed by a mayor and board of aldermen from then until 1911, when the commission form of government was established. In 1923 the present council-manager form of government was instituted. There are five administrative departments, each under the charge of a director appointed by and responsible to the city manager—department of law, department of finance, department of safety, department of public service, department of welfare. Within each department there are a number of bureaus or services, each in charge of one person who is accountable to the department director and through him to the city manager. The power of appointment is vested in the city manager, and all employees serve for an indefinite period at the pleasure of the city manager. In practice, however, matters of appointment are delegated very largely to the department directors and the chiefs of the bureaus or services concerned.

Finances.—The city operates under a budget system. Preliminary estimates are prepared by division directors in conference with the chiefs of the bureaus. These estimates are then passed to the city manager for review before being submitted to the city council.

The assessed valuation

Realty	$123, 530, 030
Personalty	18, 070, 545
Utilities	12, 231, 015

Property is said to be assessed in the neighborhood of 80 per cent of its true value. The city tax rate is $2.10 on the $100 valuation.

Operating expenditures, 1929 [1]

	Total	Per capita
General government	$158, 966	$1. 53
Police department	271, 206	2. 61
Fire department	265, 199	2. 55
All other protection of persons and property	19, 604	. 18
Conservation of health [2]	103, 430	. 99
Sanitation or protection of cleanliness	774, 206	7. 46
Highways	319, 620	3. 08
Charities, hospitals	411, 616	3. 96
Schools	1, 174, 736	11. 32
Libraries	42, 351	. 40
Recreation	42, 432	. 40
Miscellaneous	57, 809	. 55
Total	3, 641, 175	35. 08

[1] The classification is that used by the city auditor. Expenditures for permanent improvements, operation of public-service enterprises, and interest on the public debt are not included in the operating expenses as given in the above table.

[2] The item "Conservation of health" included $40,000 appropriated by the city for the support of the Beverly Hills Sanatorium.

Part I. Prevention of Illness and Promotion of Health

DEFINITION OF SERVICE

In order to take full advantage of the measures which will prevent illness and promote health, machinery must be established for giving practical application to the rapidly growing knowledge in this field. In part the attainment of health is a responsibility of the individual. Private physicians and dentists play a great rôle; in fact, they constitute the principal element in the service. A large part of the program, however, devolves upon public or governmental agencies. The enforcement of laws and regulations pertaining to health and sanitation fall within the police powers of a municipality. Such a limited program, however, is not sufficient, since a large percentage of the population can not, or at least at this stage of development, will not, take full advantage of other preventive measures unless facilities are made quite readily available. It therefore becomes necessary for a municipality to include in the general program of community betterment, facilities whereby persons, especially those of limited means or of totally inadequate resources, may receive the full benefit of preventive measures. The following activities which are directed towards preservation of a normal condition of body and mind are commonly classed as health services and are embraced in the program of a modern health department.

Health education.—The essential facts about health and disease are imparted by means of literature, motion pictures, exhibits, classroom instruction, and, more particularly, through public-health clinics and conferences.

Vital statistics.—Births and deaths are recorded in order that there may be some permanent record of the persons born or dying in the community. Death certificates are studied for the purpose of determining the various causative factors and the disease problems of the community.

Environmental sanitation.—Provision is made for determining and correcting the various physical conditions in man's environment which may be prejudicial to his health, such as the breeding of insects which transmit disease, improper housing, improper sewage disposal, and the like.

Control of milk and food supplies.—These important articles are protected by means of a sanitary inspection service and by instituting such processes as pasteurization of milk.

Water.—The health department assumes the responsibility of determining the sanitary quality of the water supply and of causing the necessary protective measures to be instituted.

Control of acute communicable diseases.—This is accomplished by lessening the possibility of contact with persons suffering from transmissable diseases; by instituting such measures as immunization, which will increase the power of resistance of the individual; by providing facilities whereby communicable diseases may be treated in the most effective manner; and by studying the various factors and influences which may determine the prevalence of such diseases.

Control of tuberculosis.—The plan embraces a careful search for cases of tuberculosis and persons in contact with cases; employment of nurses to assist in the home care of the sick; and the establishment of facilities for hospitalizing patients who can be treated more satisfactorily in institutions.

Venereal diseases.—Facilities for the treatment of infected individuals are made more readily available and other control measures are instituted which will tend to lessen the possibility of the transfer of the infection.

Maternity hygiene.—Expectant mothers are afforded facilities for acquiring information concerning the hygiene of this period. Clinics and nursing service are made available to those not in a position to secure such care through private sources.

Child hygiene.—From birth the child is placed under the supervision of a private physician or a clinic, and nurses periodically visit the homes to instruct mothers in the proper care of children. Facilities are established in the schools and elsewhere whereby physical defects

and disorders can be located in order that parents may institute corrective measures.

Industrial and adult hygiene.—Conditions under which individuals work are made as sanitary and healthful as possible, and every safeguard is thrown around the workers in order that their health may be maintained in the best possible condition. They are protected from hazards which can be avoided.

Degenerative diseases.—Diseases, such as heart disease, diabetes, kidney disorders, and cancer are now taking a great toll of life. Much of this loss can be avoided by the detection of these conditions in their early stages.

Laboratory.—Many diseases and disorders as well as the sanitary quality of milk, water, and other articles of food can not be determined except with the aid of a laboratory. As a consequence, a satisfactory community health program must include diagnostic laboratory facilities.

Miscellaneous service.—Each community may have problems of its own, such as malaria, plague, goiter, dysentery, intestinal parasites, and many other diseases which are preventable, at least in part, and for which science has made available corrective measures.

PUBLIC HEALTH ORGANIZATION

The extent to which each of the activities enumerated are developed in a given community may be determined by such factors as available funds, the needs of the community, or the relative importance locally of the several services. The plan under which health service is being performed in Knoxville and the efficiency and adequacy of such services are discussed in succeeding sections of this report.

The health of any community is influenced by the health of contiguous areas. Furthermore, a State health department has certain local responsibilities. It is, therefore, necessary briefly to review the plan of health service of Knox County and the State of Tennessee and the relationships of these organizations to the health service in the city of Knoxville.

State department of public health.—The State Department of Health of Tennessee is located at Nashville. It has general supervision over matters pertaining to the health and lives of the people of the State. Certain standards of public health practice are defined in State laws and regulations of the State department of health, and the State department of health is charged with their enforcement. Such laws and regulations cover registration of births and deaths, control of communicable diseases, construction and operation of water and sewage treatment plants, stream sanitation, and similar items related to the protection of the public health. A few services must of neces-

sity be rendered directly to the individual citizens of the State by a State department of health, but it is the policy of the Tennessee State Department of Health to discharge its responsibility to local areas by promoting the establishment of and working through effective local health organizations. The State department renders financial assistance to such local health organizations and exerts a certain amount of supervisory influence over them, largely by a plan of consultation service. State health activities pertaining to food are under the State department of agriculture. Those pertaining to health and safety in industry are discharged by the State department of labor. Physicians are licensed by the State medical examining board. The manner in which the State department of health participates financially and technically in the bureau of health of Knoxville is discussed in succeeding sections of the report.

County health service.—On July 1, 1928, the county, in cooperation with the State department of health, established a county department of health to serve Knox County, exclusive of Knoxville. The personnel, at the present time, consists of one full-time medical health officer, one sanitary inspector, two public health nurses, and one clerk. The total budget is $14,656, of which $9,656 is contributed by the county, and $5,000 by the State department of health. The county department of health, in so far as its limited resources permit, conducts a generalized public health program directed toward the prevention of illness and the promotion of general health. A physician from the Beverly Hills Sanatorium operates the tuberculosis clinics. Patients suffering from venereal diseases are cared for at the Knoxville city bureau of health venereal disease clinic. The county employs one county physician and one visiting nurse to care for the sick poor. Patients may be seen in the office of the county physician, or, when necessary, they are treated in their homes. Those suffering with tuberculosis are hospitalized at Beverly Hills Sanatorium. The county has a contract with the Riverside-Fort Sanders Hospital for hospitalization of white patients, and with the city of Knoxville for hospitalization of colored patients at the Knoxville General Hospital.

HISTORY OF PUBLIC HEALTH SERVICE IN KNOXVILLE

Status in 1923.—In 1923 a survey of public health service in Knoxville was made by Surg. Carroll Fox of the United States Public Health Service. At that time the city health department was under the charge of a physician engaged in private practice who devoted but a few hours a day to the work of the department. The office of the city health department and the laboratory of the city health department were combined and operated in conjunction with the private

laboratory and private office of the city health officer. The personnel of the city health department was as follows:

Health officer, part-time	1
Clerks	2
Laboratory technicians	1
Inspectors	5
Fumigators	1

The total city appropriation for health work proper was $11,000. In addition, the city subsidized the venereal disease clinic of the health center to the extent of $3,000, making the total appropriation by the city for the protection of the public health $14,100. The records, however, credit the city with an expenditure of $17,404.

The Knoxville Health Center was organized in 1920 to supplement the program of the city health department and to provide means whereby indigent persons might obtain ambulatory treatment and nursing care. The building also housed the Red Cross, Tuberculosis Society, and a branch laboratory of the State health department. The cost of the health center proper was $26,333, which was defrayed by private donations and miscellaneous receipts.

The school board was employing 2 white physicians and 1 colored physician, all on a part-time basis, 4 white nurses and 1 colored nurse, and 1 supervisor of nutrition. The program then, so far as the records indicate, appears to have been very much as it is at the present time, except for a slight increase in the nursing service. The approximate expenditure was $10,000.

In summary, it appears from the records that the total number of employees engaged in health work during the fiscal year 1922–23 was as follows:

Health officer, part-time	1
School and clinic physicians, part-time	5
Sanitary inspectors	6
Laboratory technicians	1
Public health nurses	13

The total expenditure by all agencies including the health center was $53,737, or 61.5 cents per capita. The appropriation for the city health department proper, however, was only $17,404, or 19.9 cents per capita.

Subsequent progress.—A trained public health officer was employed on a full-time basis in May, 1924. Since that time other technical positions have been placed upon a professional and full-time basis. The total number of technical employees engaged by the city bureau of health has increased from 10 in 1923 to 55 at the close of 1929. In some instances this increase represents merely a transfer of personnel from nonofficial to official agencies, while in other cases it represents an absolute increase in number.

Recorded expenditures for health service exclusive of board of education and nursing fees

Fiscal year	Total amount	Per capita	Fiscal year	Total amount	Per capita
		Cents			*Cents*
1922-23	[1] $53,737.00	61.5	1926-27	$62,531.76	63.6
1923-24	[1] 55,000.00	60.0	1927-28	66,387.23	65.7
1924-25	58,000.00	62.5	1928-29	65,061.73	63.8
1925-26	61,296.75	64.1	1929-30	74,282.00	69.7

[1] Estimated.

It was not always possible to analyze these expenditures in sufficient detail to segregate expenditures for public health from funds used for other purposes. The figures do not always represent expenditures for comparable items. For example, up to 1927 the cost of the city physicians was included with the health service; prior to the opening of the contagious disease hospital the cost of the smallpox pest house was charged to the bureau of health; and in like manner certain of the health-center clinics received a small subsidy from the city, but the entire support of the clinics was credited to the budget for health service. Appropriations made by the school board and nursing fees are not included since the fiscal year 1924-25, but the fiscal practice of previous years could not be ascertained. From the meager information obtainable the following statement concerning expenditures seems warranted: During the fiscal year 1922-23 the appropriation for public-health work given to the bureau of health was $17,404, or approximately 20 cents per capita; during the fiscal year 1929-30, the appropriation for public-health service given to the bureau of health was $74,282 or 69.7 cents per capita. A very large part of this increase in expenditure has occurred through the transfer of personnel and activities of privately supported agencies to the city bureau of health and does not represent any great increase in total personnel or service. During the period certain other significant improvements were effected.

The city has constructed a thoroughly modern water treatment plant with sufficient reserve capacity to meet increase in population for some time to come. The service has been extended so that now 96.4 per cent of the dwellings are connected to the public supply.

More than 6,000 surface privies have been replaced by sanitary pit privies. Recently a $2,000,000 bond issue was passed, providing for the construction of sewers. When the projected sewer extension work shall have been completed, sewers will be available to approximately 90 per cent of the dwellings.

The standard milk ordinance recommended by the United States Public Health Service and the State department of health has been passed and the milk supply has been improved very markedly. In a recent rating of the Knoxville milk supply made by the State department of health, raw milk rated 91 per cent, raw milk for delivery to

plants 89 per cent, and pasteurization 63 per cent of compliance with the provisions of the ordinance.

A modern diagnostic laboratory has been established in a building devoted exclusively to the purpose. This laboratory is operated in conjunction with a branch laboratory of the State department of health.

In the interval since 1923, when the office of the city health department was located in the private office of the health officer, the department has occupied different quarters, including the city market building, welfare building, and health center, but now it is quite adequately housed in a separate building, adjacent to the city hall, which has been leased by the city. During this time practically all health activities formerly borne by voluntary agencies have been transferred to the city and are now being conducted by the city bureau of health.

Further details concerning the present status of the public health service in Knoxville, together with recommendations for the future, appear in succeeding parts of this report.

Summary of ratings, 1926, 1927, 1930

Item	Appraisal form allowance, 1926–1927	Knoxville score, 1926	Per cent, 1926	Knoxville score, 1927	Per cent, 1927	Appraisal form allowance, 1930	Knoxville score, 1930	Per cent, 1930
Vital statistics	60	48	80	60	100	50	43.5	87
Communicable disease control	175	115	65.7	119	68	160	124	77.5
Venereal disease control	50	46	92	50	100	50	43.5	87
Tuberculosis control	100	26	26	43	43	90	63.3	70.3
Maternity hygiene [1]						80	57.2	71.5
Infant hygiene [1]	350	210	60	238	68	80	47.8	59.8
Preschool hygiene [1]						80	30.2	37.7
School hygiene [1]						120	70.2	58.5
Food and milk control [2]	175	99	56.5	111	63.4	70	51.2	73.1
Sanitation [2]						80	49.5	61.8
Laboratory	70	51	72.8	53	75.7	60	56.8	94.6
Popular health instruction	20	15	75	15	75	40	20.8	52
Cancer control	0					20	0.0	
Heart disease control	0					20	0.0	
Total	1,000	610	61.0	689	68.9	1,000	658.0	65.8

[1] These services were combined under the heading "Health of the Child" in the second edition of the appraisal form.

[2] These services were combined under the heading "Sanitation" in the second edition of the appraisal form.

NOTE.—The total score attained in 1924 was 351 out of a possible 1,000 points, but neither the appraisal form allowance nor the score attained in the several items of service could be ascertained.

The health service of Knoxville was appraised in 1924 by Dr. W. S. Rankin, in 1926 by Dr. St. Clair Drake, in 1927 by Dr. W. H. Ennes, and in 1930 by the writer. In each instance the appraisal form for cities, developed by the Committee on Administrative Practice of the American Public Health Association, was used, and the score was based on the service performed during the preceding year. Presumably the first edition of the appraisal form was used by Doctor Rankin in 1924. The second edition of the appraisal form for city health work was used for the 1926 and 1927 surveys, while the third edition was used for the 1930 survey. The weights given the several

items are not the same in the three editions of the appraisal form. It is, however, estimated that the standards of the 1929 revision are about 10 per cent higher than those of the second edition.

PRESENT PLAN OF SERVICE ORGANIZATION

Services.—The following health and related services are performed by the agency under which the services are listed:

City bureau of health:
- Registration of births and deaths.
- Control of communicable diseases.
- Environmental sanitation.
- Control of food and milk.
- Infant and preschool hygiene.
- Public health and bedside nursing.
- Venereal disease and tuberculosis clinics.
- Laboratory.
- Popular health instruction.
- Dental clinic.

Knoxville school board:
- Physical examination of school children.
- Health teaching.
- Dental clinic.
- Salary of five public-health nurses employed by the city bureau of health.

Knoxville General Hospital:
- General hospital service.
- Contagious-disease hospital.
- Out-patient department including prenatal clinic.

City physicians:
- Treatment of patients in homes and city jail.
- Determination of eligibility from the medical point of view for admission to the General Hospital.

Beverly Hills Sanatorium board:
- Beverly Hills Tuberculosis Sanatorium.
- Assistance in conduct of tuberculosis clinics for city and county.

Department of public works:
- Garbage and refuse collection and disposal.
- Operation of water and sewerage systems.
- Plumbing and housing inspection.

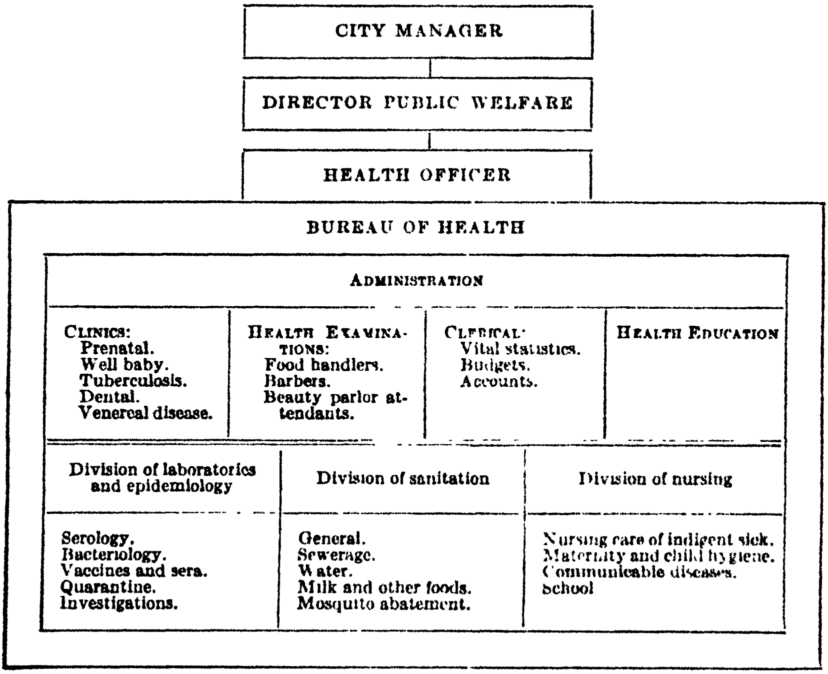
Nonofficial health agencies:
- Nonofficial health agencies do not conduct independent health activities but rather supplement the work of official health agencies.

Organization of Bureau of Health.—The bureau of health is in the department of public welfare. The health officer is appointed by and serves at the pleasure of the city manager. He, however, is accountable to the director of public welfare for the conduct of the bureau of health. The city charter specifies that the health officer may be either a physician licensed to practice medicine in Tennessee or a doctor of public health. The qualifications for other employees are not specified. No mention is made in the charter or in ordinances of

the time employees shall devote to their duties or the conditions under which they may engage in other activities.

The bureau of health operates on a budget which is prepared by the health officer. It must be approved by the director of public welfare and the city manager before being presented to the city council. The internal organization and management of the bureau is left very largely to the health officer.

PLAN OF ORGANIZATION—BUREAU OF HEALTH



PERSONNEL

Position and number of employees

Position	Number of persons		Total
	Full-time	Part-time	
HEALTH DEPARTMENT			
Health officer	1		1
Epidemiologist	1		1
Clinic physicians		6	6
Dentists		2	2
Nurses	18		18
Inspectors	11		11
Veterinarians		2	2
Technicians	4		4
Other	14	2	16
Total	49	12	61
BOARD OF EDUCATION			
Physicians		6	6
Dentists		2	2
Nurses	5		5
Nutritionist	1		1
Total	6	8	14
Grand total	55	20	75

Qualifications

[Full-time city health department employees]

TRAINING AND EXPERIENCE—PUBLIC HEALTH PHYSICIANS

No.	Personnel designation	Education (years of resident study)				Year of medical graduation	Public-health experience (in years)
		High school	College	Medicine	Public health		
1	Health officer	4	2	4	1	1921	9½
1	Epidemiologist	4	2	4	1	1921	2½

TRAINING AND EXPERIENCE—SANITARIANS

No.	Personnel designation	Education (years of resident study)				Public-health experience (in years)
		High school	College	Public health	Other scientific profession	
1	Chief sanitary officer	4	1	1½	1½	7
2	Sanitary officer	4	4	½	None.	8
3	do	4	1	½	None	2½
4	do	4	None.	None.	None.	5
5	do	None.	None.	None.	None.	1
6	do	None	None	None	None	23
7	Dairy inspector	4	4	None.	None.	2½
8	Assistant dairy inspector	4	6	None.	None.	½

TRAINING AND EXPERIENCE—PUBLIC HEALTH NURSES

No.	Personnel designation	Education (years of resident study)				Year of graduation, general nursing	Public health experience (in years)
		High school	College	General nursing	Public health		
1	Director	4	4	3	1	1922	7
1	Supervisor	4	4	3	1	1912	8
1	do	4	0	3	[1] 12	1908	9
1	Staff nurse	2	0	3	0	1909	4
1	do	3	0	3	0	1916	6
1	do	1	0	3	0	1917	3
1	do	4	0	3	0	1919	4
1	do	2	0	3	0	1919	4
1	do	4	0	3	0	1919	5
1	do	4	1	3	0	1920	4
1	do	4	0	3	0	1921	5
2	do	2	0	3	0	1922	5
1	do	3	0	3	0	1922	1
1	do	2	0	3	0	1923	1½
1	do	2	0	3	0	1924	4
1	do	2	0	3	0	1924	3
1	do	1	0	3	0	1924	½
2	do	4	0	3	0	1926	1
1	do	3	0	3	0	1927	2
2	do	4	0	3	0	1928	1
2	do	4	0	3	0	1929	1

[1] Weeks.

EXPENDITURES (FISCAL YEAR 1928 29) [1]

	Amount expended
City bureau of health:	
Administration	$7,095.49
Vital statistics	1,025.87
Communicable disease control	2,031.16
Venereal disease control	10,506.35

[1] These expenditures do not include the operation of the tuberculosis sanatorium, the communicable-disease hospital, and certain clinics at the general hospital which are of a public-health character.

City bureau of health—Continued.	Amount expended
Infant hygiene	$999. 00
Public health nursing	12, 150. 53
Milk control	5, 572. 99
Other foodstuff control	5, 409. 20
Public health laboratory	7, 864. 97
General sanitation	12, 174. 45
Miscellaneous	231. 72
Total	65, 061. 73
Per capita	. 638
Board of education:	
Total expenditures	12, 265. 00
Per capita	. 118
Metropolitan Life Insurance Co.:	
Total expenditure	22, 160. 00
Per capita	. 213
Grand total expenditures	99, 486. 73
Total per capita expenditure	. 969

COMMENTS

In Knoxville, health and hospital services are administered by separate bureaus under the department of welfare of the city government, and all employees serve at the pleasure of the city manager. A great many health and hospital administrators feel that these services, either singly or combined, should constitute a primary unit of government accountable to the chief executive either directly or through a board.

The view is also held by many that a greater stability of organization will obtain and a higher type of person will be attracted to professional positions when some definite legal provision is made for continuity of tenure. It must, however, be said that under the present plan of governmental organization in Knoxville both health and hospital services have advanced quite satisfactorily but for some unknown reason the several bureaus have not been properly coordinated on a common purpose. This might be accomplished through the establishment of an advisory council in which would be represented all agencies and organizations directly concerned or who have an interest in matters pertaining to health.

The internal organization of the bureau of health appears to be quite satisfactory. Some advantage might be gained through the establishment of a division of medical services in which would be placed control of communicable diseases, tuberculosis, and venereal diseases, maternity and child hygiene, and public-health nursing. The desirability of having this arrangement may be increased as the above services become more fully developed.

Persons in administrative and the more highly technical positions appear to be well qualified. Many of the staff nurses and the sanitary officers, however, have had little or no special public-health training.

The provision of the charter regarding the qualifications of the city health officer in some respects does not conform to the State law, which specifies that a health officer must have graduated from a reputable medical school.

The city is to be commended for the rapidity with which it has increased its expenditure for public health, even though much of this increase has been consumed in taking over activities formerly supported by private agencies. The present appropriation from city funds (63.8 cents per capita) and the total appropriation by all agencies, official and nonofficial (96.8 cents per capita) is far below the amount required to support properly the services embraced in the Knoxville program. The support of a health program sufficient to meet the needs of the average city requires an annual expenditure of about $2 per capita. Knoxville should therefore look forward to additional expenditures for public-health service.

VITAL STATISTICS

Births and deaths from selected causes [1]

		1918	1919	1920	1921	1922	1923
Live births	Number	993	1,177	1,558	1,758	1,800	1,872
	Rate	13.5	15.4	19.7	21.5	21.3	21.4
Stillbirths	Number [2]	-----	-----	-----	-----	-----	123
	Rate	-----	-----	-----	-----	-----	65.7
Total deaths	Number	1,305	1,084	1,346	1,196	1,189	1,371
	Rate	17.7	14.2	17.0	14.6	14.1	15.7
Deaths under 1 month of age (neonatal)	Number	64	74	98	83	105	83
	Rate	64.4	62.9	62.9	47.2	58.3	44.3
Infant deaths (under 1 year)	Number	171	170	219	210	187	207
	Rate	172.2	144.5	140.6	119.5	103.9	110.5
Maternal deaths (143-150)	Number	18	16	18	37	28	25
	Rate	18.1	13.6	11.6	21.1	15.6	13.4
Typhoid fever (1)	Number	13	15	21	18	20	13
	Rate	17.6	19.6	26.5	22.0	23.6	14.9
Smallpox (6)	Number	1	0	0	0	0	1
	Rate	1.4	0	0	0	0	1.1
Measles (7)	Number	3	4	70	3	2	15
	Rate	4.1	5.2	88.5	3.7	2.4	17.2
Scarlet fever (8)	Number	1	2	4	3	2	3
	Rate	1.4	2.6	5.1	3.7	2.4	3.4
Whooping cough (9)	Number	19	2	22	11	6	7
	Rate	25.8	2.6	27.8	13.4	7.1	8.0
Diphtheria (10)	Number	10	19	22	8	8	8
	Rate	13.6	24.9	27.8	9.8	9.5	9.2
Influenza (11)	Number	213	67	92	17	41	91
	Rate	289.0	87.7	116.3	20.8	48.5	104.1
Tuberculosis (all forms) (31-37)	Number	140	131	124	116	108	134
	Rate	190.0	171.5	156.8	141.6	127.7	153.3
Cancer (43-49)	Number	43	45	62	56	62	62
	Rate	58.3	58.9	78.4	68.4	73.3	70.9
Pellagra (54)	Number	24	12	11	17	20	20
	Rate	32.6	15.7	13.9	20.8	23.6	22.9
Heart diseases, all forms (87-90)	Number	93	94	93	95	108	112
	Rate	126.2	123.0	117.6	116.0	127.7	128.2
Pneumonia (all forms) (100-1)	Number	119	100	120	87	107	129
	Rate	161.4	130.9	151.7	106.2	126.5	147.6
Diarrhea and enteritis under 2 (113)	Number	49	27	35	67	41	69
	Rate	66.4	35.3	44.2	81.8	48.5	78.9
Acute and chronic nephritis (129)	Number	99	80	75	78	81	106
	Rate	134.2	104.7	94.8	95.2	95.7	121.3
Auto accidents (188c)	Number	1	10	16	14	20	14
	Rate	1.4	13.1	20.2	17.1	23.6	16.0

[1] The numbers and rates used in this table were prepared from the records of the State registrar of vital statistics. In many instances these figures do not agree with reports of the Knoxville Bureau of Health. These discrepancies are discussed in other sections of the report.

[2] Not tabulated prior to 1923.

Births and deaths from selected causes—Continued

		1924	1925	1926	1927	1928	1929
Live births	Number	1,994	2,138	2,148	2,501	2,368	2,256
	Rate	22.1	23.0	22.5	25.4	23.4	21.7
Stillbirths	Number [1]	119	78	124	153	128	101
	Rate	59.7	36.5	57.7	61.2	54.0	44.7
Total deaths	Number	1,344	1,313	1,425	1,544	1,560	1,400
	Rate	14.9	14.1	14.9	15.7	15.4	13.5
Deaths under 1 month of age (neonatal)	Number	100	81	91	92	92	91
	Rate	50.2	37.9	42.3	36.8	38.8	40.3
Infant deaths (under 1 year)	Number	215	179	185	184	211	181
	Rate	107.9	83.8	86.0	73.6	89.0	80.2
Maternal deaths (143-150)	Number	22	22	10	28	16	23
	Rate	11.0	10.3	4.7	11.2	6.8	10.2
Typhoid fever (1)	Number	33	21	20	12	12	16
	Rate	36.6	22.6	20.9	12.2	11.9	15.4
Smallpox (6)	Number	1	0	0	0	0	0
	Rate	1.1	0	0	0	0	0
Measles (7)	Number	21	0	6	13	6	0
	Rate	23.3	0	6.3	13.2	6.0	0
Scarlet fever (8)	Number	8	2	1	3	2	1
	Rate	8.8	2.2	1.0	3.1	2.0	1.0
Whooping cough (9)	Number	12	12	6	16	3	12
	Rate	13.3	12.9	6.3	16.3	3.0	11.6
Diphtheria (10)	Number	8	8	10	3	6	9
	Rate	8.8	8.6	10.5	3.1	6.0	8.7
Influenza (11)	Number	37	46	57	48	112	88
	Rate	41.0	49.5	59.6	48.8	110.9	84.7
Tuberculosis (all forms) (31-37)	Number	122	111	140	124	112	83
	Rate	135.5	119.5	146.4	126.1	110.9	80.0
Cancer (43-49)	Number	60	66	80	93	81	85
	Rate	66.6	71.1	83.7	94.6	80.2	81.9
Pellagra (54)	Number	18	42	54	60	34	28
	Rate	20.0	45.2	56.5	61.0	33.7	27.0
Heart diseases, all forms (87-90)	Number	138	133	172	180	166	146
	Rate	153.0	143.2	179.9	183.1	164.5	140.6
Pneumonia (all forms) (100-1)	Number	133	98	109	159	161	96
	Rate	147.6	105.5	114.0	161.8	159.4	92.4
Diarrhea and enteritis under 2 (113)	Number	63	52	56	31	61	37
	Rate	69.9	56.0	58.6	31.5	60.4	35.6
Acute and chronic nephritis (129)	Number	82	89	84	103	105	92
	Rate	91.0	95.9	87.9	104.8	104.0	88.6
Auto accidents (188c)	Number	24	23	35	19	33	45
	Rate	26.6	24.8	36.6	19.3	32.7	43.3

[1] Not tabulated prior to 1923.

Total live-birth and total death rates are per 1,000 population, stillbirth, infant death, and maternal death rates are per 1,000 live births. All other rates are per 100,000 population.

Analysis of birth and death rates.—The apparent low birth rates during the years 1918, 1919, and 1920 were probably due to incomplete registration. During the remainder of the period under consideration the rates were quite constant and about the same as those which obtained in the cities of the United States registration area. Figures on stillbirths prior to 1923 were not tabulated. During the succeeding years the stillbirth rates were slightly higher than those for the cities of the registration area.

The total death rates have remained from 1 to 2 points above the cities of the registration area, but many cities of Tennessee have even higher rates. Infant (children under 1 year) mortality rates are unusually high, averaging about 30 points above cities of the registration area and far in excess of the rates which might be expected where preventive measures are adequately and effectively applied.

The average maternal mortality rate is well above the usual experience; and for certain years has been twice that of the cities of the registration area. To a limited extent the high rates may be attributed to nonresident deliveries in local hospitals; but the rates can not be explained on the basis of deliveries by midwives or the negro population. While there has been some fluctuation in these rates from year to year, there has not been any great change since 1918.

Knoxville has one of the highest typhoid fever death rates of any city of its size. A very perceptible drop occurred in 1926, due probably to improvement in sanitation; but since that time there has been a slight upward trend. The smallpox rates, in contrast with those for most diseases, are very good, there being only three deaths reported during the last 12 years. The vigorous vaccination program pursued by the city can probably be credited with at least a part of this achievement. There seems to be an excessive number of deaths from both measles and whooping cough, especially during epidemic years. The death rates from diphtheria and scarlet fever are about the usual experience in cities throughout the country, although these diseases are, as a rule, quite mild in the southern portion of the United States. The tuberculosis rates show a very definite downward trend. While the rates compare very favorably with those of the State as a whole, they are unduly high, particularly since city deaths occurring in the Beverly Hills Sanatorium are not charged to Knoxville. City deaths in Beverly Hills Sanatorium for the past three years were as follows: 1927, 18; 1928, 30; 1929, 44.

The pellagra problem is indeed a serious one, the death rates being consistently the highest for any city or county in the State. The diarrhea and enteritis (under 2 years) death rates are high and fail to show any sustained downward trend. The number of deaths from this as well as other conditions peculiar to young children clearly indicate the need for a more vigorous child hygiene program. The death rates from malignant and degenerative diseases (cancer, heart disease, nephritis) are far below the rates which obtain in the cities of the registration area. The age distribution of the population (large number below 45 years) as given in the 1920 census might account for some of the difference. The figures on age distribution compiled for the 1930 census are not available, but it is questionable whether there will be any great change from the 1920 distribution. Beyond the facts stated, there is no apparent cause for the low rates for malignant and degenerative diseases.

The number of deaths due to automobile accidents continues to increase. In 1919 there were 10 deaths due to this cause; in 1929 there were 45 deaths.

HEALTH SERVICES

REGISTRATION OF BIRTHS AND DEATHS

The city of Knoxville was admitted to the United States registration area for deaths in 1917 and the birth registration area in 1927, having been taken in, in each instance, with the State of Tennessee. At the present time, Knoxville constitutes a single registration district. The health officer is registrar, but the duties are performed by a clerk in the office who acts as deputy. A copy of each certificate is retained and the original is sent to the State registrar at Nashville. The data appearing on the certificates are quite completely tabulated and analyzed by the bureau of health, although in some instances standard practice was not inaugurated until the beginning of 1930.

Comments.—The registration of births and deaths receives a score of 43.50 out of a possible 50 points. In the main, practice is quite good, but some loss was sustained since certain essential data were not available for years previous to the current one. There is a striking discrepancy between the statistics of births and deaths compiled by the city registrar and those compiled by the State registrar, notwithstanding the fact that the same source material is used by both. In part, this discrepancy may be explained by the fact that the city registrar is not using the Manual of Joint Causes of Death, thus bringing about occasional differences in the assignment of cause of death. Another possible reason is that the registration district formerly included a part of Knox County. These two reasons, however, are not considered sufficient to account for such wide differences in basic data as were found. Differences between rates found in this study and rates appearing in earlier reports published by the city bureau of health are due largely to the fact that population estimates here used are based on censuses of 1920 and 1930 while estimates used by the city bureau of health in earlier publications were necessarily based on censuses of 1910 and 1920.

Recommendations.—It is recommended:

(1) That the State and the local registrars determine the various factors causing differences in figures and that corrective measures, including the use of the Manual of Joint Causes of Death, be instituted by the city registrar.

(2) That the copies of certificates retained by the local registrar be more securely bound and filed in such a manner as to insure their preservation.

(3) That certain principal causes of death, and infant and maternal deaths, be analyzed in more detail, such detailed analysis to be extended back over the years for which records are available.

COMMUNICABLE DISEASE CONTROL

The control of communicable diseases was handled directly by the health officer, until October 1, 1929, when financial aid was received from the State department of health thus making possible the employment of an epidemiologist on a permanent basis. The epidemiologist gathers the usual routine information on the major communicable diseases and these data are analyzed in quite a satisfactory manner. He also imposes the control measures such as quarantine and disinfection, and supervises the release. A special epidemiological study of typhoid fever has been in progress for the past several years. Cases of communicable disease are visited by the nurses who assist in educational work and do a certain amount of bedside nursing. Selected cases of communicable disease are hospitalized in the communicable disease unit of the General Hospital. This unit was opened in December, 1928; its capacity is 30 beds and it is thoroughly modern in design and equipment. It is operated by the Knoxville General Hospital in the same manner as the other divisions of the hospital are operated.

At the present time there is no organized program of immunization against diphtheria or typhoid fever. Several years ago the county medical society objected to such activities on the part of the city bureau of health and the practice was discontinued. It was, however, agreed that the physicians in their private capacity would immunize all persons who would apply at their offices, if the bureau of health would furnish typhoid vaccine and diphtheria toxin-antitoxin. Diphtheria immunization continues to be an exclusive activity of the private physicians. The nurses of the bureau of health, however, under the instruction of the private physician have continued to immunize contacts with active cases of typhoid fever. There is no accurate record of the total number of persons immunized against typhoid fever or diphtheria. The records, however, show that sufficient typhoid vaccine was distributed during the year to immunize 1,725 persons and sufficient diphtheria toxin-antitoxin to immunize 345 persons. Vaccination against smallpox is a requirement for admission to the public schools. This regulation of the city board of education seems to be quite thoroughly enforced. The bureau of health also vaccinates contacts with known cases of smallpox when circumstances constitute an emergency.

Comments.—The control of communicable diseases receives a score of 128.0 out of a possible 160. Reporting of communicable diseases is slightly more than 40 per cent of the requirements, even when diseases reported on the weekly summary report cards are included. These latter reports, however, are received rather late for the institution of effective control measures. Control practice otherwise is very

good. It would seem, however, that nurses could be utilized to a greater extent for gathering epidemiological information and for imposing control measures. The epidemiologist could then devote more time to the study and definition of public health problems and to determining the most effective method for their solution.

It seems rather peculiar that no cases of ophthalmia neonatorum have been reported or were otherwise known to the bureau of health. If one may judge the prevalence of gonorrhea among pregnant women by the presence of the infection among the clinic clientele, there is every reason to assume that cases of ophthalmia must be occurring, particularly since aggressive measures for prevention are not instituted, only 164 ampules of silver nitrate having been distributed.

The number of communicable disease patients hospitalized is slightly below the standard, although the performance is very good in view of the fact that the hospital was opened rather recently. Experience has demonstrated that it takes several years to popularize the use of a hospital for communicable diseases. The outstanding defect in the program for the control of communicable diseases is the small number of persons immunized against typhoid fever and diphtheria. At least until the sewerage system now contemplated has been installed and more homes are connected with it, a more aggressive typhoid immunization campaign is indicated. The present plan of having the physicians in their private practice do the immunization sounds very good in theory but in practice it does not seem to be effective since, from such records as could be obtained, there seems to be a distinct decrease in the number immunized each year since the plan was inaugurated. Every effort should be made by the health department to promote immunizations by physicians in their private practice. On the other hand, it is not sound practice and physicians are exceeding their prerogatives when they attempt to take away from the health officer his most effective method of combating certain diseases.

The communicable disease code does not conform with State laws and regulations of the State department of health. The present practice of following the State department of health regulations without having them enacted into local ordinances is not considered correct legal procedure. The present ordinance, which requires the muzzling of all dogs allowed to run at large and the destruction of those without muzzles, is essentially sound in principle but it is not enforced. If experience has proved that the enforcement of this ordinance is not feasible, a less drastic ordinance requiring the licensing of dogs might be substituted. In any event, however, there should be a more definite attempt to rid the city of stray and ownerless dogs, since the control of rabies and the relief from worry and expense incident to the

treatment of dog bites will ultimately depend on keeping the dog population at a minimum.

Recommendations.—It is recommended:

(1) That the reporting of communicable diseases be improved and that doctors be encouraged to telephone reports in addition to making reports on the weekly summary report cards.

(2) That the nurses be used to a greater extent for control measures and for collecting epidemiological data.

(3) That the epidemiologist project a program of study with a view to determining and defining public-health problems as well as improving public-health practices.

(4) That an effort be made to bring about a more extensive distribution of silver nitrate solution for prevention of ophthalmia neonatorum and better reporting of the disease.

(5) That the health officer be placed on the staff of the Knoxville General Hospital and be allowed to participate in the management of the communicable disease unit.

(6) That some plan be developed in cooperation with the county medical society whereby the bureau of health may actively engage in immunization, particularly against diphtheria, giving particular attention to children below the age of 5.

(7) That the communicable disease ordinances be revised so as to bring them into conformity with State laws and regulations of the State department of health.

VENEREAL DISEASE CONTROL

The city bureau of health operates a venereal disease treatment clinic for persons meeting the eligibility requirements common to all treatment clinics.[1] The venereal disease clinic is housed in the Knoxville General Hospital. The patients are treated by two part-time clinicians who are paid a nominal fee. The other employees are one social worker, one female nurse, one male attendant, and one clerk. During the year 1,806 patients made 31,467 visits to the clinic. In May, 1930, the clinic was opened to county patients, the county paying a nominal sum. The follow-up work and other social hygiene activities in connection with the clinic are performed for the most part by the social worker, who utilizes the services of the male attendant and the field nurses of the city bureau of health. The Camp Home for Friendless Women is operated by the city department of public welfare as a jail for female prisoners and a place of detention for venereally infected women who refuse to comply with clinic discipline. The city jail is used for male offenders. The police department also employs one policewoman who is frequently called upon to assist in venereal

[1] Eligibility requirements common to all treatment clinics, see Part II, "Care of the Sick."

disease control measures and social-hygiene activities. Certain of the voluntary agencies, notably the Church Mission of Help, assist in the social hygiene program, especially with unmarried mothers.

Comments.—Venereal disease control activities receive a score of 43.50 out of a possible 50 points. While the total number of cases reported is well above the standard, these reports are received almost exclusively from the clinics and scarcely any from the private physicians and hospitals. The clinic program is excellent, although the quarters are totally inadequate and the work is therefore done under a decided handicap. This condition is aggravated by the admission of county patients. The follow-up work on clinic patients appears to be very good, but it would seem that a more active program of follow-up work might be developed as a service to private physicians and other agencies concerned with the venereal disease problem.

Camp Home for Friendless Women is essentially a jail, and, while it may have some salutory influence in compelling clinic discipline, it is a decided handicap from the point of view of social restoration. If anything is to be accomplished in the latter field, it must be done in a place more suited for this purpose. Such an undertaking, however, should be regarded as a social enterprise and should be conducted as part of a larger scheme for salvaging those who are capable of social and economic readjustment. Such an outlay purely for the purpose of controlling venereal diseases is not likely to yield returns commensurate with the investment. Camp Home is discussed more fully in the section devoted to welfare.

A common impression is held locally that venereal diseases are unusually prevalent in Knoxville. In 1928 a study of venereal disease incidence in Tennessee was made by the United States Public Health Service, in cooperation with the State health department. The method pursued was to determine the number of persons under treatment by practicing physicians, clinics, and hospitals on a given day. The study revealed the following figures concerning the cases of both gonorrhea and syphilis among the white population of Tennessee cities.

	Case rate per 1,000
Memphis	17.02
Nashville	12.95
Chattanooga	18.71
Knoxville	8.72

It would therefore appear from these figures that the very excellent program of venereal disease control in Knoxville is having its effect and that the supposed excessive prevalence as compared with other cities does not exist. There seems to be a very wholesome attitude of concern on the part of the health authorities of Knoxville for the venereal disease problem.

Recommendations.—It is recommended:

(1) That a more definite attempt be made to secure reports from private physicians and hospitals and that a plan of follow-up service be developed for private physicians on those private cases who refuse to take adequate treatment.

(2) That more suitable and adequate clinic quarters be provided, thus making possible more satisfactory working conditions, more privacy for the patient and better separation of children and family groups from the common run of clinic patients.

(3) That the county pay a sum more in keeping with the cost of service rendered to county patients.

(4) That the clinic personnel be increased in order to lighten the load on the staff, thus making possible greater attention to the individual patient, particularly along the lines of social hygiene.

(5) That the present standards of eligibility for admission to the clinic be modified and liberalized for cases of family syphilis and that the six months' residence requirement be waived for at least the acutely infectious cases.

TUBERCULOSIS CONTROL

The city bureau of health operates one diagnostic clinic for white patients and another for colored. The former is conducted at the city bureau of health and the latter at the colored library. During the year 1,329 persons made 1,418 visits to these clinics. Early in the summer of 1930 a special childhood tuberculosis clinic was established. The home-nursing service is done by the field staff of the city bureau of health under the direction of a specialized tuberculosis nurse. The nurses served 874 patients to whom they made 2,395 home visits. Patients are hospitalized at the Beverly Hills Sanatorium, which is operated jointly by the city and county. During 1929, 161 adults and 28 children from Knoxville were hospitalized at this institution, the period of hospital residence being from six to eight months. The superintendent of the sanatorium is in charge of clinics for the city bureau of health, thus affording an opportunity for the selection of patients for admission to the sanatorium and a place to which patients can be discharged for further observation and management. There are no special provisions in the schools for children suspected of having tuberculosis. An active nutrition program, however, is in operation, and arrangements have been made whereby all children are given a hot noon lunch and the undernourished may also be given breakfast. One of the luncheon clubs operates a camp each summer for children predisposed to tuberculosis. The camp can accommodate about 20.

Comments.—Tuberculosis control receives a score of 63.30 out of a possible 90 points. The clinic service as now organized should be quite satisfactory when it becomes better established. As yet most patients are well advanced in the disease when they come to the attention of the clinic, and the number of visits per patient registered is far too low. The intensity of the nursing service is not as yet up to standard, and there is very serious question concerning the necessity for the specialized supervisor of tuberculosis nursing. The present system of selecting patients for admission to the tuberculosis sanatorium and discharging them to the field clinic should operate quite satisfactorily after it shall have been in operation for a reasonable period of time. The whole program seems to be developing quite apart from the private physicians, who should assume a greater responsibility for the management of the patient. There is a distinct need for a plan of cooperation between the bureau of health and the board of education whereby selected children may be given rest periods and have their school work adjusted to their physical condition. The Beverly Hills Tuberculosis Sanatorium is discussed in further detail in Part II, "Care of the Sick."

Recommendations.—It is recommended:

(1) That a more definite effort be made to locate a greater number of patients, especially those in the early stages of the disease.

(2) That the practicing physicians be utilized to a greater extent, especially in the management of patients following discharge from the sanatorium.

(3) That the schools establish special facilities for children predisposed to tuberculosis and that such work be conducted in close cooperation with the childhood tuberculosis clinic of the city bureau of health.

(4) That the number of visits by patients to the field clinic and by the nurse to the home of the patient be increased.

MATERNITY HYGIENE

In 1929, 2,256 births occurred, of which 2,230 were attended by physicians, 21 by midwives, and 5 were unattended. Approximately 30 per cent of births occurred in hospitals. A prenatal clinic is conducted twice a week by the Knoxville General Hospital at its outpatient department. One hundred and thirty-eight prenatal patients made 948 visits to this clinic. Patients not already under the nursing service are referred to the bureau of health. The nurses served 796 patients, to whom they made 4,066 home visits. A large percentage of the prenatal cases carried by the nurses were beneficiaries of the Metropolitan Life Insurance Co.

Comments.—Knoxville has a maternal death rate slightly higher than that of the other large cities of the State and considerably in

excess of that of the Registration Area. The unfavorable position of Knoxville in this regard can not be explained on the basis of the colored population or the number of deliveries by midwives. To a certain extent non-resident deaths play a part, but the number is not sufficient to explain the excess in deaths over that of comparable areas. There is no home delivery nursing service, and it may be desirable to develop a plan whereby nursing service at the time of delivery could be given in the home. The number of persons registered for prenatal clinic supervision is less than half of what it should be, although the number of visits per case registered is quite high. The maternity hygiene nursing service seems to have been fairly satisfactory during the past year except for the absence of a home delivery service.

In view of the fact that the Metropolitan Life Insurance Co. is to terminate its contract with the bureau of health for nursing service, it will become incumbent upon the nurses to develop some other method of approach. It is suggested that a plan might be developed whereby physicians would refer their private patients to the bureau of health for nursing service. Other desirable developments are a home delivery nursing service and a plan whereby patients may be admitted to the general hospital for delivery to be followed by a short period of hospitalization.

Recommendations.—It is recommended that:

(1) A thorough study be made of maternal mortality, with a view to determining the relative importance of the several causes of death and for devising methods whereby the death rate can be reduced.

(2) There be an expansion of the prenatal clinic and home nursing services.

(3) A revision be made of record system in order that a notation may be made of visits by patients to private physicians and of the instruction given to field nurses by private physicians.

(4) There be developed a home delivery nursing service and a greater utilization of the general hospital for obstetrical service through shortening the period of residence in selected cases.

INFANT AND PRESCHOOL HYGIENE

The infant and preschool age groups are handled very much as one. The bureau of health operates nine infant and preschool child health centers located in different parts of the city. These health centers are located in churches or other semipublic places. Six are for white children and three for colored. Two white practicing physicians and one colored physician are employed on a part-time basis and are paid a nominal fee for each clinic session. During the past year 276 clinic sessions were held. Five hundred and twenty-seven infants were registered at these clinics and they made 1,919

visits. The nursing service is performed by the bureau of health nursing staff as a part of their general nursing activities. The nurses carried 978 patients to whom they made 7,637 home visits. Baby boarding homes are not licensed by the city. The boarding of babies has not as yet developed on a very extensive scale. It is being undertaken in a limited way by the Children's Bureau, one of the community welfare agencies. The Junior League operates a day nursery in the mill section.

The preschool clinical service is not well developed, since only 188 children were registered at the clinics. These children made 1,658 visits. The same children were visited by the nurses, who made 1,310 home nursing visits. Each year an effort is made to examine children about to enter school for the first time. Last year 179 children were registered at such clinics but there is no tabulation of the defects found or the corrections effected.

Comments.—Infant hygiene received a score of 47.8 out of a possible 80, and preschool hygiene received a score of 30.2 out of a possible 80. The infant death rate for the past three years has averaged 80.9. While this rate compares very well with that for the State as a whole, and with many of the larger cities, it is far in excess of the death rate which obtains where modern public health practices are given effective application. When the present projected sewerage system shall have been completed, sanitation should then be quite satisfactory, and a further saving in child life will depend upon the personal instruction of mothers regarding infant care. The more intelligent and those of higher economic status should of course seek the advice of the family physician. For a large group, however, it will be necessary to establish means whereby this information may be easily obtained, as through infant welfare clinics, home nursing service, and the like.

The present clinical and nursing service for infants is about 50 per cent of what it should be. Similar services for the preschool children are totally inadequate. For example, 3,267 preschool children should have received clinical service when as a matter of fact but 188 were registered at clinics. Similar deficiencies exist in the nursing service. It also appears that a sufficient amount of work has not been done to detect and correct physicial defects among the preschool children. This is the age when corrective measures are most effective.

Recommendations.—It is recommended that:

(1) An extension be made of the clinical service for both infants and preschool children, notably the latter.

(2) There be an extension of nursing service for both infants and preschool children, especially the latter.

(3) A change be made in the record system whereby nurses may record visits of children to private physicians and instructions issued by private physicians to field nurses.

(4) There be a greater utilization of the private physician for infant and preschool hygiene work.

(5) A special study of infant mortality be made with a view to determining specific causes and devising effective and economical preventive measures.

SCHOOL HYGIENE

School hygiene work is administered by the city board of education. The personnel consists of one white and one colored physician who work one-half of each day throughout the school year; three white physicians who work 3½ hours per day for 2½ months while the annual physical examination is being conducted; one white dentist and one colored dentist employed for part-time throughout the year; one supervisor of health instruction and nutrition; and five nurses who are assigned to the general district nursing service of the city bureau of health. The total expenditure for health work, not including the salary of the supervisor of health instruction and nutrition, was $12,265.

The pupils included in the program of medical inspection are the kindergarten children and those of the first, fourth, and sixth grades, the R. O. T. C. of the high school (possibly half of the boys in attendance), and all pupils engaging in athletics. Vaccination is a requirement for attendance. The children able to pay are expected to be vaccinated by their family physician, but the indigent are cared for by the school physician. The nurses do the routine inspection for communicable diseases and skin diseases, assist in the annual physical examination of children, and perform home visits for the purpose of inducing correction of physical defects. Dental clinics are conducted in the schools by the school board on Tuesday, Thursday, and Friday of each week and by the city bureau of health on Monday and Wednesday of each week at the office of the bureau of health. The dental work in the schools is limited for the most part to examination, prophylaxis, and extraction, while work done by the bureau of health is very largely reparative in character.

The annual physical examination is conducted without removal of the clothing, and about two minutes are required for the examination of each child. The defects are reported to the parents by written notice, and the nurses do follow-up work to induce the correction of physical defects. The number of defects found is somewhat below that usually encountered, and this is particularly true of those defects which can be detected only by the more thorough type of examination. There is no record of the number of children who went to the family physician for the more thorough type of examination. The nurses

record those corrections on which home visits are made but there is no record of other corrections.

The school board engages in quite an extensive nutrition program. The supervisor of health instruction has charge of the nutrition work, including the cafeteria. All children are weighed twice each year and the underweight children are weighed monthly. Underweight children are given a free lunch in the middle of the day if they are unable to pay for same. The more extreme cases are also given a free breakfast.

The required amount of formal classroom instruction in health is given, but below the seventh grade it is not based upon a standard textbook. The direction of this health teaching is a function of the supervisor of health instruction and nutrition. There are no special classes of any type for the underprivileged children, irrespective of whether the handicap be physical or mental. The board of education employs a director of physical education but the work is not coordinated with that of the city director of recreation and there appears to be very little joint use of facilities. Only 5 of the 36 elementary schools have 4 acres or more of playground and only 1 high school out of a total of 6 high schools has 6 acres or more of playground. Several schools are lacking in adequate toilet and lavatory facilities.

Comments.—The program concerning the hygiene of the school child is quite extensive and diversified, but its several elements are not properly correlated and directed toward the accomplishment of specific objectives. The greatest defect in the program is the separation of school medical service from other elements of the child-health program. The frequent, almost annual, turnover of medical personnel precludes the possibility of there being a continuity of policy in regard to physical examinations. The practice of devoting not more than two minutes to the examination of each child, without a concerted effort to bring such children to the attention of the family physician for a more thorough physical examination, is not considered good practice and rather tends to discredit the whole procedure. There does not appear to have been a definite check-up of the number of persons brought to the attention of the family physician or of the number of defects corrected.

The number of nursing visits is well above the standard requirement, although there may be some question concerning the effectiveness of these visits as may be judged by the limited corrective work of which there is record. There appears to be a great deal of complaint against the nursing service, very largely on the grounds that a nurse is not always available in the schools when she might be desired for first aid and similar work. The real foundation for this complaint could not be determined unless it be a desire for a nursemaid type of service.

A special study of health teaching was made by Mrs. Arch Trawick, consultant in health teaching, of the State health department.

The teaching of health was reported by her to be very well organized, well directed, and, in general, of a very high order. Impression, however, was gained that there was lack of correlation between the teaching of health and the other branches of the health service, and a consequent lack of understanding on the part of the child concerning the necessity of having corrective work performed. The system of awards for corrective work stresses dental and nutrition work at the expense of other essential corrections.

The program of physical education as described should be quite satisfactory, although the facilities are rather limited and they do not seem to be used to the fullest extent possible. The reason for the lack of coordination and definite integration between the physical education work of the schools and work of the city director of recreation was not understood but appears to constitute a serious defect in the program. On numerous occasions and by previous surveyors it was recommended that the medical aspect of the school hygiene work be placed under the city bureau of health. For reasons, many of which were not ascertained, such a transfer was not made. In fact a more definite separation is contemplated. At the opening of the coming school term the board of education will discontinue subsidizing five nurses of the bureau of health and will establish its own nursing service, thereby effecting a complete separation between the work of the board of education in the field of health and the bureau of health. Such a step will completely nullify all attempts which have been made to provide a unified program of child-health service continuing from infancy to adult life.

Recommendations.—It is recommended:

(1) That the school board transfer to the city bureau of health all of its activities pertaining to child hygiene except the formal teaching of hygiene.

(2) That the city bureau of health employ a full-time physician, trained in child hygiene, who will have charge of the school hygiene activities and assist in the conduct of the infant and preschool child welfare stations operated by the bureau of health.

(3) That physical examinations of children be more thorough or that a more consistent attempt be made to place the child in the hands of the family physician for a more thorough type of physical examination, especially when serious defects are suspected or when a complete examination is otherwise indicated.

(4) That the infant and preschool child welfare stations operated by the bureau of health be utilized for the more thorough type of physical examination of selected school children who are unable to pay the cost of such service by a private physician.

(5) That a more definite attempt be made to enlist the interest of the parents by having a larger percentage of them present at the physical examination.

(6) That a change be made in the record system whereby visits to the physician will be entered as well as all corrections irrespective of who was responsible for the individual correction.

(7) That health instruction and other phases of child hygiene be more definitely correlated in order that the child as well as his teacher may acquire a better understanding of the whole program.

(8) That schools not at the present time so equipped be supplied with sanitary drinking fountains, adequate lavatory facilities, individual towels and soap.

(9) That there be an extension of the recreation facilities of the school board and the development of a plan whereby both the facilities and personnel of the department of physical education of the school system and of the city bureau of recreation may be united on a common program of physical education and recreation which will extend throughout the year.

(10) That the proposed plan of developing a separate school nursing service be reconsidered and that an effort be made to develop a consolidated, generalized nursing service in cooperation with the city bureau of health.

(11) That special classes be organized in the school system for the physically and mentally handicapped and that a system of supervised rest be instituted for children predisposed to tuberculosis.

(12) That the "Blue Ribbon Program" of the State department of health be introduced as a means of promoting the correction of physical defects.

FOOD AND MILK CONTROL

Food.—The sanitation of food producing and dispensing establishments is carried out as a part of the general sanitation program and under the direction of the chief of sanitation, who exercises sanitary supervision over the down-town food establishments and the principal ones on car lines in outlying districts. Other food establishments in the outlying districts are handled by a district inspector. Hotels and lodging houses are handled in very much the same manner and by the same personnel. The rating system used for food establishments is patterned after the principle underlying the standard milk ordinance. All food establishments are required to have hot water (170° F. or above) for dish washing. After being washed the dishes are immersed in a chlorine solution containing not less than 35 parts per million available chlorine. Food establishments meeting the requirements of the bureau of health are given a certificate of approval which is displayed in the establishment. About 50 per cent of the

restaurants and soda fountains have reached a degree of perfection meriting approval.

Milk.—The control of the milk supply is under the charge of a separate division accountable directly to the city health officer. The personnel consists of one chief inspector, one assistant inspector, and one office clerk. The employment of a third inspector is contemplated. The standard milk ordinance recommended by the United States Public Health Service and the State department of health was adopted by the city of Knoxville in 1924 and has been in effect since that time.

Milk is derived from 390 dairy farms, all of which are located within a radius of 50 miles. There are six pasteurizing plants. Sixty-one per cent of the milk is pasteurized. The pasteurizing machinery is not of recent design and is in rather bad repair, but the defects are being corrected. All farms are inspected twice each year, and the pasteurizing plants are inspected at least once each month. All cows are tuberculin tested and reactors are promptly removed. The consumption of sweet milk is approximately two-thirds of a pint per person per day. Formerly an attempt was made to control 170 small dairies selling a small quantity of buttermilk in the city of Knoxville, but the control of these dairies is being limited to one inspection per year.

Meat.—Most of the meat consumed in Knoxville is derived from plants under Federal supervision. The slaughtering of animals in the city of Knoxville, not under Federal supervision, is conducted at a single plant and is under city supervision. This plant, while rather old, is provided with refrigeration, a tank, and other necessary equipment. It is in fair sanitary condition. The city meat-inspection service is under the direction of a part-time veterinarian who is assisted by two lay inspectors, one of whom is on duty at the Knoxville abattoir while the other inspects the city market. Questionable carcasses and parts are tagged and held for subsequent inspection by the veterinarian. Farm-killed meat is permitted when organs are attached for inspection. Large animals, however, are not accepted under any conditions. Poultry is not inspected. A charge is made for inspection as follows: 2 cents for small animals, 10 cents for large animals, and 2 cents for parts of animals.

Comments.—Food and milk control received a score of 51.24 out of a possible 70 points. The sanitation of food producing and dispensing establishments seems to be very good. A loss of 17.8 points in total score was sustained because of insufficient pasteurization, only 61 per cent of the milk being pasteurized. While the pasteurization machinery is not of modern design and is not in good repair, the correction of these defects is now in progress. The inspection service for the farms and for the pasteurizing plants is quite efficient, though the

force is not adequate. A recent survey made by the State health department was conducted to determine the percentage of compliance with the provisions of the standard milk ordinance. Raw milk delivered to consumers received a rating of 91 per cent compliance, raw milk delivered to pasteurizing plants 89 per cent, pasteurization 63 per cent, and enforcement methods 91 per cent. In general, it may be stated that the Knoxville milk supply is quite satisfactory, except for the one outstanding defect—the low percentage of pasteurization. A milk supply can not be considered safe until all milk is properly pasteurized.

The local slaughterhouse is in fair sanitary condition and the inspection service seems to be well conducted. The chief defect lies in the inadequate inspection of home-killed meat and meat products. Prohibitory legislation is the only satisfactory method of handling the problem, but its passage and enforcement probably would not be feasible. Until the public and law enforcement officials become more sympathetic toward control measures for farm-killed meat, it is questionable whether much can be done in this field.

Recommendations.—The following recommendations are made:

(1) A more vigorous attempt to secure universal pasteurization of milk.

(2) Correction of defects in pasteurization machinery.

(3) More frequent inspection of pasteurization plants and producing farms.

(4) Encouragement of the use of cultured buttermilk and less emphasis on control of farms producing buttermilk until the sweet milk supply has been placed under more satisfactory supervision.

(5) The employment of one additional dairy inspector.

GENERAL SANITATION

The general sanitation program of the city bureau of health includes the enforcement of sanitary features relating to the disposal of excreta, to the collection and disposal of garbage and refuse, and to the general sanitation of public places and private premises. The personnel consists of 1 chief inspector, 6 district inspectors, and 1 clerk.

During the past few years a complete sanitary survey of the city has been made. The results have been tabulated and are now being studied in connection with various disease problems which can be attributed to insanitary conditions. A repetition of this sanitary survey is contemplated.

Water.—The public water supply is obtained from the Tennessee River. A thoroughly modern treatment plant of ample capacity was completed two years ago. The plant is well operated. The water as it is pumped into the distribution system is well within the

standards of purity established by the United States Treasury Department. At certain places along the distribution system, however, samples continue to show contamination intermittently. It is believed that cross-connections in industrial plants with other supplies of questionable character account for these bad samples. According to the findings of the sanitary survey, 96.4 per cent of dwellings are connected to the public supply. The remainder of the city is supplied with water as follows: 1.89 per cent of the population by wells; 0.69 per cent by cisterns; 1.22 per cent by springs; and 2.25 per cent have no water on the premises. Samples from these private supplies have been taken from time to time and, as might be suspected, quite frequently they reveal the presence of surface pollution. A consistent campaign is being conducted to eliminate the private supplies and force connections to the public supply.

Sewerage.—The sanitary survey recently completed reveals that 66.2 per cent of the dwellings are connected to the public sewers; 25.44 per cent have sanitary privies; and 8.14 per cent have septic tanks. Sewage is discharged into the Tennessee River untreated. There is no local nuisance, since the discharge pipes are well below the low-water mark and provision has been made for proper dispersion of the effluent. The septic tanks and privies have been installed under supervision and meet the standards specified by the bureau of health. Quite recently a $2,000,000 bond issue for the construction of sewers was passed. By the end of 1931, when the project will be completed, the public sewer will be accessible to about 90 per cent of the dwellings. There is a real estate development of about 650 homes in the Burlington subdivision around Chilhowee Park, the sewage of which discharges into the Holston River about 8 miles above the water intake. The 650 homes now being constructed represent about 40 per cent of the possible ultimate development. Some concern is expressed about the influence of this sewage on the city water supply. The water works authorities, however, consider that the plant can adequately take care of the added load.

Garbage.—The department of public service operates the garbage system, which includes the collection and disposal of garbage, refuse, and dead animals. Householders are required to have a covered metal garbage can and to separate the ashes from the trash and garbage. Garbage is burned in an incinerator and the noncombustible trash is spread on a lot adjacent to the incinerator. The entire cost of the garbage and trash collection system is borne by taxes and no fee is charged the householder. A small amount of the downtown restaurant and hotel garbage is collected by hog feeders.

Housing.—The following information was compiled as of January, 1928, by the city planning commission:

Developed areas.—The total developed area of the city was found to be 12.92 square miles, of which 3.61 square miles were streets and alleys, 0.11 square mile was parks and playgrounds, 1.48 square miles were devoted to schools, churches, cemeteries, institutions, etc., and 7.72 square miles were built up with residences, business, or industry. The total developed area is approximately 50 per cent of the total city area. It will be noticed that the space devoted to parks and playgrounds is almost negligible. Practically one-half of the city's area is vacant land.

Population.—The population of the city was estimated to be 102,000, which is 7,900 persons per square mile of developed territory.

Single-family residences.—There were 20,081 single-family dwellings housing 90,036 persons. This amounts to 88.8 per cent of the total population and 42.5 per cent of the total developed area.

Two-family residences.—There were 147 of this type of dwelling, housing 1,323 persons. This represents 1.3 per cent of the population of the city. The area occupied by duplexes was 0.24 per cent of the total developed area.

Multiple dwellings (three or more families).—There were 146 apartment houses containing a total of 1,096 apartments and housing 2,744 persons. This is equivalent to 2.68 per cent of the total population and 0.24 per cent of the total developed area.

Present uses, in per cent of built-up area.—One-family dwellings constituted 71.09 per cent; 2-family dwellings, 0.39 per cent; multiple dwellings, 0.70 per cent; retail business, 3.1 per cent; light industry, 4.82 per cent; heavy industry, 6.81 per cent; and railroad property, 13.09 per cent of the total built-up area of the city.

Building permits for each of past five years.—By consulting building permit records, figures were obtained on the number of single-family dwellings, 2-family dwellings, and apartment houses built in each of the years from 1923 to 1927, inclusive. It was found that single-family dwelling construction remained fairly constant during the period, an average of about 700 new homes being built each year. Two-family dwellings varied from year to year, the number ranging from 4 to 22. Apartment house construction showed a marked increase in 1927 over the previous years. Twenty-four permits for apartments were issued in 1927 as compared to 2 permits for the previous year.

During the sanitary survey conducted by the bureau of health, the sanitary facilities were found to be as follows:

	Percentage of dwellings supplied
Water:	
City water	96. 40
Wells	1. 69
Springs	1. 22
Cisterns	. 69
None on premises	2. 25
Sewerage:	
Public sewer	66. 20
Sanitary privies	22. 44
Septic tanks	8. 14
None on premises	3. 22
Screening:	
Complete	52. 44
Partial	28. 15
None	19. 41

A limited amount of additional information concerning construction and occupancy was collected, but these items were not tabulated.

A comprehensive zoning ordinance was enacted in January, 1930, and the building code was recently brought up to date. These ordinances are not retroactive, except when major structural changes are involved. Defects in existing structures may be corrected through condemnation but this procedure is seldom resorted to. The building inspector is charged with the enforcement of the zoning and the building ordinances. Matters pertaining to health and sanitation are handled by the bureau of health.

Miscellaneous.—The possession of livestock within the city limits is permitted under certain restrictions specified in the ordinance. Permits are issued by the bureau of health. The screening of hotels, restaurants, and boarding houses is required by city ordinance, but there is no requirement concerning private residences. The elimination or treatment of collections of water to control mosquito breeding is a function of the sanitation division of the bureau of health. Law enforcement has presented quite a problem, as it is particularly difficult to secure convictions for violations of ordinances relating to water supplies and disposal of excreta and other waste matter.

Comments.—Sanitation receives a score of 49.5 out of a possible 80 points. Twelve points are lost on water because of cross-connections and because all dwellings are not connected. Severe penalty is sustained because of the small percentage of dwellings with sewer connections. Every effort should be made to locate and eliminate cross-connections between public and private water supplies. With this done Knoxville would have a public supply which could be considered most satisfactory. Springs and wells in any built-up community are dangerous, and water-borne epidemics are always imminent so long as water from such questionable sources is used.

The city is to be congratulated upon the extension of the sewer system. The laying of these sewers, however, should be followed very promptly by the strict enforcement of the ordinance requiring connection to the public sewer. Privies and septic tanks are not considered satisfactory methods of excreta disposal in built-up sections; they should not be used if sewers can be made available. Knoxville, as well as the other cities of the State, should make provision for treating the sewage, thus conserving the purity and usefulness of the many and valuable streams of the State. Sewage from the Burlington real estate development may not be any great hazard; yet the margin of safety of the water supply would be increased if some plan could be developed whereby the sewage could be discharged below the water intake or be treated at the present outfall. It is questionable, however, if the expenditure is justified at the present time. Incineration is a very satisfactory method of garbage disposal. The provision

of the ordinance, however, which requires the separation of ashes from trash and garbage is not observed, and thus it is possible for the incinerator to consume only 60 per cent of the material brought to it. An effort is being made at the incinerator to separate the garbage from the trash and ashes, but this is not possible in many instances, thus necessitating the spreading of organic matter on a near-by lot. The material is not covered.

The advisability and necessity of making a complete second sanitary survey is questioned. It would appear much more profitable to concentrate on the defects found in the last survey with a view to instituting corrective measures, more particularly connections to the sewer. The number of sanitary inspections is in excess of the usual requirement. This can be explained, to a certain extent, on the basis of the sanitary survey. It would seem that complaints should be answered by the department responsible for the service; for example, those pertaining to garbage, refuse, and the like might well be referred to the department of public service. Any saving made thereby might well be used to increase the nursing service. A certain amount of antimosquito work is now being done, very largely for the purpose of controlling the pestiferous variety of mosquito. Occasional cases of malaria are reported by private physicians and others are reported by the General Hospital. So far as could be ascertained, no systematic malaria survey has ever been made of the city of Knoxville. Such a survey would seem desirable to ascertain the malaria problem but more particularly to determine the necessity and effectiveness of the present antimosquito program.

Recommendations.—It is recommended:

(1) That some person be assigned to make a careful check of the industries and other places in the city where cross-connections between the public and private water supplies might be found and that such cross-connections be eliminated without delay.

(2) That all springs and wells be abandoned as private water supplies and that all dwellings be forced to connect to the city supply.

(3) That all dwellings, residences, and places of business be required to connect to the public sewer system as rapidly as sewers become available.

(4) That the provisions of the present ordinance requiring the separation of ashes from trash and garbage be enforced. If this does not prove feasible, the incinerator should be enlarged. There should be better sanitary control of the garbage and refuse dumps with ample provision for covering with earth.

(5) That a malaria and mosquito survey be conducted, preferably by the malaria engineer and malariologist of the State department of health.

(6) That the law-enforcement agencies show more concern regarding violations of ordinances pertaining to sanitation and health.

LABORATORY SERVICE

The city bureau of health laboratory is housed in a building especially constructed for the purpose. The laboratory is quite well suited to the needs of the city. The scientific equipment is in good condition. The personnel consists of one director, three technicians, one secretary, and one helper. The laboratory is also used as a branch laboratory by the State health department for the examination of specimens from 16 adjoining counties. In consideration of this service the State contributes $2,500 per annum. The usual type of public health examinations are made. During the year, 19,318 specimens were examined for the city of Knoxville and 8,116 for the State of Tennessee. The laboratory also has charge of the distribution of biological products, such as sera, vaccine, and the like, for use by physicians in the city.

Comments.—The laboratory is admirably suited to the purpose. The score received is 56.8 out of a possible 60 points. The laboratory is well equipped and the technique appears to be good. The total number of specimens is well above the quota specified in the appraisal form. The number of diphtheria specimens, however, is strikingly low, and the same is true of specimens of pasteurized and raw milk.

Recommendations.—An effort should be made to secure a better distribution of specimens for examination. The number of diphtheria specimens and the number of samples of milk taken both before and after pasteurization should be increased.

POPULAR HEALTH INSTRUCTION

Popular health instruction is distributed throughout the bureau of health, with each division attending very much to its own educational work. Press releases, however, are handled very largely by the health officer. The bulletins and other printed matter are obtained for the most part from the life insurance companies, but material from the State and governmental health agencies is used to a limited extent. The bureau of health publishes an annual report in mimeographed form, but the distribution of the report is rather limited. Newspaper articles are released with very definite regularity.

Comments and recommendations.—This activity receives a score of 20.8 out of a possible 40 points. The newspaper publicity appears to be very good. Bulletins prepared by health agencies would be much more suitable than those prepared by commercial agencies, notably the life insurance companies. The annual report of the department is very good, but the complete report or a summary of it should be

given much wider local distribution. Plans should be developed whereby the various organizations would take a more active and positive part in the community health program.

PUBLIC HEALTH NURSING

The entire nursing program, with the exception of the work of four nurses employed by the industries, is performed by the bureau of health. The city holds a contract with the Metropolitan Life Insurance Co. for bedside nursing to its policy holders, for which the city was paid 82 cents per visit, or a total of $22,160 during the year. The school board pays part of the salary of five nurses, contributing a total of $7,080. The bureau of health supplements this by $1,800 for transportation purposes.

Nursing personnel and source of funds

Position	Bureau of health	Metropolitan Life Insurance Co.	School board	Total
Supervisor	1			1
Field director	1			1
Staff nurses	4	10	5	19
Total nurses	6	10	5	21
Secretary	1			1
Clerk	1			1

Since the early part of 1930 the Rosenwald Fund has contributed half the salary of one colored nurse, who devotes the major part of her time to tuberculosis work. At about the same time the local tuberculosis society started contributing to the salary of a special tuberculosis supervisor.

The nursing service is under the charge of the supervisor of nursing, who is accountable directly to the city health officer for the conduct of all nursing activities and for supplying nursing service to the several divisions. The generalized district plan of nursing is followed; that is, the city is divided into districts and one nurse performs services of all types in her particular district, including bedside nursing. A specialized supervisor of tuberculosis nursing was employed early in 1930 and the plan for the future contemplates the employment of a person especially trained to supervise nursing work relating to infancy and maternity hygiene. During 1929, 63,403 home visits were made, and of this number 32,528 were made to policyholders of the Metropolitan Life Insurance Co. It was not possible to separate visits for the purpose of giving bedside care from visits of the instructive type made solely for public health purposes. A further description and analysis of the nursing service appears in the various sections of the report in which nursing plays a part.

Comments.—There are 22 nurses, or one nurse to each 4,681 inhabitants. It has been found from experience that where a generalized nursing program is followed there should be one nurse to each 2,000 inhabitants. In other words, the present nursing personnel is scarcely 50 per cent of which it should be. On October 1, 1930, the contract with the Metropolitan Life Insurance Co. terminates and that agency will establish its own nursing service. The board of education also contemplates establishing its own nursing service when school opens in the fall. The bureau of health, in turn, plans to increase its staff nurses to eight. The future program of the bureau of health provides for concentration on the control of communicable diseases, including tuberculosis and venereal diseases and an expansion of the maternity, infancy, and preschool child hygiene work. The breaking up of the nursing service is to be regretted, particularly the establishment of a special nursing corps by the board of education. The separation of the Metropolitan Life Insurance Co. nursing service is a step taken on the part of the company. However, many of the public authorities and the local physicians feel that this arrangement will be advantageous to the bureau of health, thereby enabling it to concentrate on preventive activities and persons who are not beneficiaries of other health agencies. The nursing service, under the new arrangement, will have lost many of its contacts. Much of this ground, however, should be recovered if the proper liaison can be developed with the private physicians and with the Knoxville General Hospital whereby the bureau of health nurses can be utilized to a greater extent. Under this reorganization of the nursing service the necessity of having specialized supervisors for tuberculosis and child welfare is very seriously questioned. With such a small nursing force, namely four assured at the time of the survey and six additional in prospect, it would seem that one supervisor should be ample to meet the needs.

SPECIAL PROBLEMS

CANCER CONTROL

While the cancer death rate in Knoxville is below the experience of most cities, cancer is a principle cause of death. At the time of this survey there is no organized program in Knoxville for the control of cancer and related malignant conditions.

The city now maintains a pathological laboratory and an outpatient department in connection with the General Hospital. With very slight effort and little or no added expense it should be possible to develop the nucleus of a diagnostic cancer clinic. The bureau of health should then undertake a program of popular instruction concerning the necessity for early diagnosis and prompt treatment. A thorough study should be made of cancer deaths in order to detect any special features which might complicate the local problem.

HEART DISEASE CONTROL

At the present time there is no organized program in Knoxville for the control of heart disease. This condition is one of major importance and is being incorporated into the programs of many health departments.

The Knoxville General Hospital through its out-patient department could, without much effort or expense, organize a special clinic for cardiac patients. The problem of convalescent care will be a difficult one to solve until better facilities are established for convalescent and chronic patients; but pending the establishment of such facilities much could be done through a well-organized social service department. Much effective work in the prevention of heart disease can be done in childhood. In order to accomplish this, the child hygiene program must be expanded and the work with the school children should be made more careful and thorough.

INDUSTRIAL HYGIENE

Work in this rapidly growing field of health service has not been undertaken by either the State or the local health department. There is a State compensation law, but the allowances are rather low. The State department of labor has charge of safety and sanitation in industry. Four local industries employ nurses and the medical work is done by local practicing physicians on a part-time or call basis. The exact amount and nature of preventive industrial hygiene work in local industries was not ascertained, although it was reported to be rather inadequately developed.

The bureau of health, with its limited resources, must of necessity address its activities to the more pressing problems and those specified in ordinances. It should, however, make a survey of the industries in order to ascertain the health hazards. Following such a study some assistance might be given to the industries in the solutions of their health problems, even with the present resources of the bureau of health.

MENTAL HYGIENE

Problems resulting from mental defects and disorders present themselves in all walks of life. They are to be found in homes, in schools, in industries, in courts, and elsewhere. The more serious maladjustments lead to mental break-down or antisocial conduct. Science now has a better understanding of causative factors; consequently, with a proper health organization mental ills can be detected early, and frequently the individual can be adjusted in the community. The nucleus of a mental hygiene program is a well-organized psychiatric clinic. This clinic, as well as the whole program, should be under the direction of a trained psychiatrist.

At the present time even the most rudimentary mental hygiene work is not being performed by any health or welfare agency in Knoxville. While there is no question about the need for mental hygiene work, a psychiatric clinic or a child-guidance clinic as an isolated institution would probably be of little use until after the local program of child and family welfare has emerged from the institutional stage. A mental hygiene program should be preceded by a modern program of social case work. In any event, however, better provisions should be made for mental cases at the Knoxville General Hospital.

PELLAGRA

The death rate for pellagra is unusually high. Some fluctuation occurs from year to year, but the rate has been rising for the past 12 years. At the present time approximately 200 patients are under more or less constant supervision in the pellagra clinic at the general hospital out-patient department.

Pellagra is classed as a dietary deficiency disease and is now regarded as being due to a diet low in certain food elements. As a general rule, the incidence of the disease is determined by economic conditions. In Knoxville there does not seem to be the close correlation usually found between reported deaths and general economic conditions. There is a very definite need for a study of the local pellagra problem in order that control measures may be applied in the most economical and effective manner.

NONOFFICIAL HEALTH AGENCIES

KNOX COUNTY TUBERCULOSIS ASSOCIATION

The personnel consists of a clerk and a part-time executive secretary. The total budget is approximately $6,000, all of which is collected through the sale of Christmas seals. The major items of the program are as follows:

1. Part salary of tuberculosis supervising nurse of the city bureau of health;
2. Part salary of county nutrition work ($700);
3. Tuberculosis supplies for city and county nurses;
4. Educational material used by city and county health organizations;
5. Purchase of X-ray supplies for the city bureau of health tuberculosis clinic.

As will be seen from the budgetary arrangement, the association as such does not conduct a health program but rather assists the city and county official agencies by helping to finance certain specialized services.

KNOX COUNTY RED CROSS

The regular administrative personnel consists of one executive secretary and one clerk.

Budget (all purposes)

Community chest	\$6, 082. 95
Roll call	4, 707. 05
Total	10, 790. 00

Major items of health program

1. Part salary of county nutrition work (\$1,300);
2. First aid demonstrations;
3. Instruction in life saving;
4. Home hygiene classes and care of sick;
5. Arrangement for hospitalization of ex-service men.

The Red Cross does not employ any personnel for public health work within the city. Such activities as the teaching of home hygiene classes, first-aid demonstrations, and the like are performed by the city bureau of health nurses. The publicity and organization work is done by the Red Cross.

(The concluding parts (II and III) of this report, with the summary and recommendations, will appear in the following issue of Public Health Reports.)

COURT DECISION RELATING TO PUBLIC HEALTH

Order of State board of purification of waters sustained.—(Rhode Island Supreme Court; Board of Purification of Waters *v.* Town of Bristol, 153 A. 879; decided Mar. 18, 1931.) The State board of purification of waters, after an investigation and a public hearing, found that the pollution caused by the discharge of sewage by the town of Bristol into the waters of Bristol Harbor constituted a menace to public health. An order of the board directed the town to adopt, use, and operate properly some practicable and reasonably available system or means to prevent such pollution and to submit to the board a plan or statement describing the system or means which the town proposed to adopt. The town appealed from this order on the ground that the same was unlawful, it being claimed that the board had no authority to regulate or prohibit the discharge of sewage by the town into the public waters of the State.

By chapter 936 of the Public Laws of 1901, the town of Bristol was authorized "to convey sewerage into tidewater." By a statute enacted in 1920, the board of purification of waters was created and was given authority to regulate or prohibit the pollution of the waters of the State, including all tidewaters and the inland waters of any stream or pond. The act was operative throughout the State, except that it did not apply to the sewage discharged by the city of Newport and the town of Jamestown. By a decision of the supreme court rendered in 1926, this act was held to be a valid exercise of the police power of the State for the protection of the public health and the public welfare. By chapter 1451 of the Public Laws of 1929–30, chapter 936

of the Public Laws of 1901, relating to the town of Bristol, was amended. The purpose and effect of the amendment, as stated by the supreme court, were to validate an unauthorized appropriation for sewerage purposes previously made at a financial town meeting. The supreme court held that the 1920 act, respecting the board of purification of waters, revoked the authority previously given to the town of Bristol for the disposal of its sewage, and that such authority was not revived by the amendment of the 1901 act made by chapter 1451 of the 1929–30 laws. The order of the board was sustained.

DEATHS DURING WEEK ENDED APRIL 25, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended April 25, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Apr 25, 1931	Corresponding week, 1930
Policies in force	75, 152, 845	75, 763, 029
Number of death claims	14, 384	16, 196
Death claims per 1,000 policies in force, annual rate	10. 0	11. 1

Deaths [1] from all causes in certain large cities of the United States during the week ended April 25, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Apr. 25, 1931				Corresponding week, 1930		Death rate [2] for the first 17 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (81 cities)	8, 424	12 3	724	[4] 57	13. 4	820	13 8	13. 3
Akron	35	7 1	1	10	5 7	5	8 6	8. 7
Albany [5]	38	15 3	8	158	16. 7	2	15 4	17. 2
Atlanta	86	16. 2	7	72	16. 9	11	16. 3	17. 1
White	41		2	32		5		
Colored	45	([6])	5	144	([6])	6	([6])	([6])
Baltimore [5]	233	14. 9	16	54	15 2	19	17. 1	15. 7
White	170		11	48		13		
Colored	63	([6])	5	78	([6])	6	([6])	([6])
Birmingham	55	10. 6	5	50	12. 0	1	15. 6	14. 2
White	32		2	34		0		
Colored	23	([6])	3	73	([6])	1	([6])	([6])
Boston	239	15. 9	30	86	15. 8	23	16. 4	16. 2
Bridgeport	34	12. 1	3	50	14. 6	5	13. 0	13. 8
Buffalo	137	12. 3	. 12	49	14. 2	19	15. 1	14. 5
Cambridge	26	11. 9	2	40	17. 0	1	13. 9	14. 2
Camden	33	14. 5	4	70	20. 6	1	17. 7	15. 2
Canton	23	11. 2	4	91	10. 4	2	11. 2	11. 5
Chicago [5]	734	11. 1	54	48	12 6	75	11. 8	11. 7
Cincinnati	155	17. 7	11	66	13. 9	8	18. 1	17. 3
Cleveland	207	11. 8	23	67	11 5	20	12. 6	12. 4
Columbus	83	14. 6	8	78	71. 4	3	15. 1	18. 6

Footnotes at end of table.

Deaths[1] *from all causes in certain large cities of the United States during the week ended April 25, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930*—Continued

City	Week ended Apr. 25, 1931				Corresponding week, 1930		Death rate [2] for the first 17 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Dallas	52	10.0	6		10.7	2	12.6	12.5
White	38		5			2		
Colored	14	(6)	1		(6)	0	(6)	(6)
Dayton	43	10.8	4	56	10.1	3	13.6	10.7
Denver	74	13.2	5	48	11.9	9	15.7	15.7
Des Moines	22	7.9	1	18	12.8	4	12.0	12.5
Detroit	280	9.1	35	56	11.0	42	9.7	10.6
Duluth	14	7.2	1	25	10.3	1	11.7	11.5
El Paso	33	16.4	2		20.3	6	18.2	18.5
Erie	32	14.2	1	19	6.3	1	11.8	10.9
Fall River [5] [7]	30	13.6	5	113	12.7	4	13.7	14.3
Flint	32	10.2	5	64	10.2	5	8.1	10.2
Fort Worth	47	14.6	4		8.9	3	12.3	11.8
White	36		2			2		
Colored	11	(6)	2		(6)	1	(6)	(6)
Grand Rapids	32	9.7	5	74	8.0	0	9.8	11.7
Houston	80	13.5	6		12.7	4	11.9	12.9
White	47		6			3		
Colored	33	(6)	0		(6)	1	(6)	(6)
Indianapolis	96	13.5	6	49	14.1	4	15.3	16.2
White	81		5	47		3		
Colored	15	(6)	1	67	(6)	1	(6)	(6)
Jersey City	77	12.6	9	80	13.8	7	13.6	12.9
Kansas City, Kans	28	11.9	0	0	9.4	2	15.3	12.4
White	21		0	0		2		
Colored	7	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo	115	14.7	13	99	14.0	6	15.3	14.4
Knoxville	32	15.8	1	21	11.8	1	14.4	15.3
White	25		1	24		1		
Colored	7	(6)	0	0	(6)	0	(6)	(6)
Long Beach	28	9.6	0	0	9.4	0	11.0	10.5
Los Angeles	277	11.0	20	58	10.4	18	11.7	12.0
Louisville	81	13.7	7	60	12.9	3	17.1	14.7
White	61		6	59		1		
Colored	20	(6)	1	66	(6)	2	(6)	(6)
Lowell [7]	25	12.9	1	25	18.1	2	14.5	15.2
Lynn	11	5.6	0	0	10.7	1	11.9	12.2
Memphis	75	15.1	7	[8] 74	16.4	11	18.3	18.1
White	37		3	50		2		
Colored	38	(6)	4	116	(6)	9	(6)	(6)
Miami	27	12.5	4	101	10.8	2	14.6	13.0
White	19		2	71		1		
Colored	8	(6)	2	177	(6)	1	(6)	(6)
Milwaukee	94	8.3	9	39	10.6	16	10.5	10.8
Minneapolis	96	10.6	7	45	13.6	12	12.2	11.5
Nashville	53	17.8	3	45	14.9	5	18.4	17.8
White	36		3	60		2		
Colored	17	(6)	0	0	(6)	3	(6)	(6)
New Bedford [7]	30	13.9	6	159	16.7	1	13.4	12.5
New Haven	40	12.8	4	76	15.7	3	13.5	14.6
New Orleans	152	17.0	13	71	19.5	12	19.2	10.5
White	89		4	33		2		
Colored	63	(6)	9	147	(6)	10	(6)	(6)
New York	1,506	11.1	137	57	11.8	195	13.2	12.2
Bronx Borough	194	7.6	15	34	8.4	20	9.5	8.7
Brooklyn Borough	536	10.6	49	52	11.0	59	12.3	11.3
Manhattan Borough	570	16.4	53	90	18.0	98	20.2	18.2
Queens Borough	157	7.1	17	46	6.6	14	8.5	7.9
Richmond Borough	49	15.6	3	54	15.4	4	14.2	15.3
Newark, N. J	98	11.5	11	58	11.5	9	13.6	14.0
Oakland	66	11.8	2	26	12.0	8	11.9	12.0
Oklahoma City	37	9.8	4	55	7.5	2	12.1	10.5
Omaha	55	13.2	1	11	9.2	0	14.6	14.3
Paterson	38	14.3	2	34	13.9	5	15.8	13.5
Philadelphia	536	14.2	48	70	14.5	54	15.8	14.0
Pittsburgh	221	17.0	20	69	13.9	17	17.8	15.7
Portland, Oreg	74	12.6	1	12	13.4	5	12.7	13.7
Providence	67	13.7	9	83	9.9	7	15.1	15.3

Footnotes at end of table.

Deaths[1] from all causes in certain large cities of the United States during the week ended April 25, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

City	Week ended Apr. 25, 1931				Corresponding week, 1930		Death rate[2] for the first 17 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1931	1930
Richmond	55	15.6	8	117	15.9	8	17.9	16.4
White	34		4	88		2		
Colored	21	(6)	4	174	(6)	6	(6)	(6)
Rochester	77	12.1	6	55	11.7	4	13.8	13.2
St. Louis	274	17.3	20	67	15.5	24	18.0	15.2
St. Paul	63	11.9	1	10	11.1	6	11.7	11.2
Salt Lake City[5]	36	13.1	1	15	14.1	6	13.3	14.8
San Antonio	88	19.1	16		17.7	16	15.4	18.4
San Diego	29	9.7	1	20	13.6	4	15.1	15.5
San Francisco	140	11.2	5	33	14.7	6	14.4	13.9
Schenectady	18	9.8	3	88	12.0	3	11.8	12.2
Seattle	78	10.9	5	47	12.5	2	13.0	12.0
Somerville	18	8.9	1	37	16.0	4	11.0	12.4
South Bend	22	10.6	2	50	7.5	1	9.3	9.9
Spokane	25	11.2	1	26	9.9	3	13.4	13.5
Springfield, Mass	27	9.2	2	31	13.9	5	13.0	14.8
Syracuse	59	14.4	2	24	13.4	5	13.0	13.0
Tacoma	25	12.1	2	51	12.2	0	15.0	13.5
Toledo	71	12.5	3	28	14.8	5	13.6	14.3
Trenton	36	15.2	2	35	16.9	6	19.6	17.8
Utica	23	11.7	0	0	25.1	4	16.4	17.4
Washington, D. C	156	16.5	14	78	16.8	9	18.2	16.3
White	87		8	25		5		
Colored	69	(6)	11	189	(6)	4	(6)	(6)
Waterbury	19	9.8	2	60	8.3	2	11.2	10.8
Wilmington, Del.[7]	30	14.7	5	108	18.6	4	16.7	16.1
Worcester	63	16.7	5	69	12.5	2	15.2	15.5
Yonkers	22	8.3	3	79	11.5	2	10.0	9.4
Youngstown	37	11.2	1	14	10.7	2	11.6	11.0

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 76 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14, Knoxville, 15, Louisville, 17, Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32, and Washington, D. C., 25.
[7] Population Apr. 1, 1930, decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended May 2, 1931, and May 3, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 2, 1931, and May 3, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 2, 1931	Week ended May 3, 1930	Week ended May 2, 1931	Week ended May 3, 1930	Week ended May 2, 1931	Week ended May 3, 1930	Week ended May 2, 1931	Week ended May 3, 1930
New England States:								
Maine	4	1	5	2	83	110	1	0
New Hampshire	2	1	1		33	9	0	0
Vermont						49	0	0
Massachusetts	38	73	4	6	555	1,518	2	4
Rhode Island	3	7			32	7	0	0
Connecticut	7	6	3	1	466	43	1	4
Middle Atlantic States:								
New York	110	113	[1] 11	[1] 37	2,702	2,417	8	22
New Jersey	37	103	17	7	905	1,530	4	3
Pennsylvania	116	103			4,378	1,418	10	7
East North Central States:								
Ohio	68	22	77	13	1,154	900	13	5
Indiana	12	12	4		818	144	8	11
Illinois	135	159	10	10	1,680	626	21	10
Michigan	59	50	4		99	2,029	8	29
Wisconsin	11	18	29	16	677	697	1	4
West North Central States:								
Minnesota	14	30	4	1	165	209	2	2
Iowa	3	11			69	358	3	4
Missouri	29	35	1	1	429	147	8	10
North Dakota	7	3			84	26	3	5
South Dakota	3	3	2		57	61	0	0
Nebraska	7	15	5		30	826	3	2
Kansas	8	3	3	1	89	801	1	5
South Atlantic States:								
Delaware	1				205	18	0	0
Maryland [2]	14	16	12	25	1,361	79	2	4
District of Columbia	20	12	2		307	25	5	0
West Virginia	8	8	28	28	65	153	0	1
North Carolina	19	14	24	13	641	45	4	7
South Carolina	20	10	543	457	115		5	0
Georgia	5	7	115	15	166	260	2	0
Florida	3	5	6	1	176	220	5	0
East South Central States:								
Kentucky					248	175	4	0
Tennessee	3	4	85	24	108	236	2	5
Alabama	6	4	101	85	308	108	8	1
Mississippi	4	9					2	5

[1] New York City only. [2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 2, 1931, and May 3, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 2, 1931	Week ended May 3, 1930	Week ended May 2, 1931	Week ended May 3, 1930	Week ended May 2, 1931	Week ended May 3, 1930	Week ended May 2, 1931	Week ended May 3, 1930
West South Central States:								
Arkansas	3	4	92	11	56	119	1	2
Louisiana	16	19	13	6	3	72	1	8
Oklahoma [3]	13	8	73	21	24	285	0	3
Texas [4]	24	18	47	9	73	230	3	1
Mountain States:								
Montana	2	2			7	3	0	2
Idaho	1	3	6		1	2	1	5
Wyoming	1	1			2	19	2	0
Colorado	1	8			171	826	0	2
New Mexico	4	6	2	1	38	42	1	5
Arizona	1		2	2	12	175	0	3
Utah [2]		6	5	3	1	252	0	6
Pacific States:								
Washington	4	7	33	35	118	547	2	7
Oregon	5	3	29	10	104	100	0	0
California	80	43	88	15	1,297	2,053	8	4

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended May 2, 1931	Week ended May 3, 1930	Week ended May 2, 1931	Week ended May 3, 1930	Week ended May 2, 1931	Week ended May 3, 1930	Week ended May 2, 1931	Week ended May 3, 1930
New England States:								
Maine	0	0	20	45	0	0	5	1
New Hampshire	0	0	1	24	0	0	0	0
Vermont	0	0	2	2	0	0	0	0
Massachusetts	0	1	340	235	0	0	4	1
Rhode Island	0	0	56	27	0	0	3	0
Connecticut	0	0	59	65	0	0	1	2
Middle Atlantic States:								
New York	1	2	863	556	3	19	14	12
New Jersey	1	0	293	224	0	0	1	0
Pennsylvania	0	2	652	403	0	1	13	8
East North Central States:								
Ohio	1	0	646	284	90	197	7	12
Indiana	0	0	205	166	72	164	1	3
Illinois	1	0	513	505	79	148	4	8
Michigan	1	2	544	273	12	65	7	7
Wisconsin	1	0	187	175	0	15	3	3
West North Central States:								
Minnesota	0	0	68	141	12	2	2	2
Iowa	0	0	81	57	66	93	0	0
Missouri	0	0	317	55	39	33	2	7
North Dakota	0	0	44	12	2	16	0	0
South Dakota	3	0	21	17	11	68	0	0
Nebraska	0	0	58	95	66	85	2	1
Kansas	0	0	62	106	118	49	3	4
South Atlantic States:								
Delaware	0	1	32	4	0	0	1	0
Maryland [2]	0	0	74	108	0	0	5	1
District of Columbia	0	0	17	23	0	0	0	0
West Virginia	3	1	31	39	3	39	9	13
North Carolina	1	0	44	40	1	15	3	1
South Carolina	1	2	4	7	0	0	5	8
Georgia	0	0	51	4	0	0	11	8
Florida	0	0	4	7	1	0	7	1
East South Central States:								
Kentucky	1	0	103	54	5	7	2	5
Tennessee	2	1	12	39	7	7	1	5
Alabama	0	0	19	8	27	6	7	6
Mississippi	0	0	13	8	54	11	6	5
West South Central States:								
Arkansas	0	0	23	1	7	4	6	3
Louisiana	0	1	30	18	39	7	12	11
Oklahoma [3]	0	0	34	40	75	92	2	4
Texas [4]	0	0	34	26	84	40	17	6

[2] Week ended Friday.
[3] Figures for 1931 are exclusive of Oklahoma City and Tulsa.
[4] Typhus fever, 1931, 1 case in Texas.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 2, 1931, and May 3, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended May 2, 1931	Week ended May 3, 1930	Week ended May 2, 1931	Week ended May 3, 1930	Week ended May 2, 1931	Week ended May 3, 1930	Week ended May 2, 1931	Week ended May 3, 1930
Mountain States:								
Montana	0	0	15	31	3	8	0	0
Idaho	0	0	7	7	3	5	0	1
Wyoming	0	0	12	3	2	11	0	0
Colorado	0	0	30	28	3	21	2	4
New Mexico	0	0	7	10	0	3	0	5
Arizona	0	1	2	17	1	17	4	1
Utah [1]	0	0	9	12	0	0	0	0
Pacific States								
Washington	1	0	35	24	43	64	2	3
Oregon	0	0	12	11	31	81	1	4
California	4	4	158	133	45	50	14	13

[1] Week ended Friday.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
February, 1931										
Arkansas	5	38	756	48	25	154	3	82	91	19
Hawaii Territory	1	26	9		258		2	2	0	4
March, 1931										
Alabama	54	86	2,280	47	2,000	44	2	113	56	14
Georgia	7	29	3,201	117	546	51	1	337	3	27
Idaho	10	13	78		57		1	121	31	20
Illinois	58	518	445	9	7,163	1	6	2,415	169	14
Iowa	10	25			82		2	492	335	4
Kansas	10	57	126	5	118		4	279	487	1
Mississippi	6	60	7,121	1,234	326	832	1	110	177	15
Montana	3	14	129		43		0	106	19	6
Nevada	1	1	44		263		0	1	0	0
New Mexico	5	20	81	4	289		1	43	16	3
Oklahoma [1]	10	40	582	44	102	54	0	133	260	12
Oregon	1	18	893		331		1	93	112	7
South Dakota	2	43	15		330		2	94	112	6
Texas	4	149	511	315		5	5	142		15
Virginia	10	110	5,959	16	3,358	47	0	205	10	8
Washington	7	35	313		219			221	165	13

[1] Exclusive of Oklahoma City and Tulsa.

February, 1931	Cases
Chicken pox:	
Arkansas	167
Hawaii Territory	26
Conjunctivitis:	
Hawaii Territory	22
Hookworm:	
Hawaii Territory	12
Impetigo contagiosa:	
Hawaii Territory	1
Leprosy:	
Hawaii Territory	4
Mumps:	
Arkansas	29
Hawaii Territory	57
Tetanus:	
Hawaii Territory	2
Trachoma:	
Arkansas	1
Hawaii Territory	44
Tularaemia:	
Arkansas	1
Whooping cough:	
Arkansas	100

March, 1931	Cases
Chicken pox:	
Alabama	248
Georgia	186
Idaho	87
Illinois	1,563
Iowa	471
Kansas	686
Mississippi	1,090
Montana	126
Nevada	20
New Mexico	113
Oklahoma [1]	82
Oregon	297
South Dakota	201
Virginia	840
Washington	575
Conjunctivitis:	
Georgia	8
New Mexico	1
Dengue:	
Mississippi	4
Diarrhea and dysentery:	
Virginia	125
Dysentery:	
Georgia	32
Illinois	12
Mississippi (amebic)	42
Oklahoma [1]	4
German measles:	
Illinois	93
Iowa	23
Kansas	6
New Mexico	4
Washington	145
Hookworm disease:	
Georgia	10
Mississippi	215
Impetigo contagiosa:	
Iowa	1
Oregon	12
Washington	2
Lead poisoning:	
Illinois	5
Lethargic encephalitis:	
Alabama	5
Illinois	5
Kansas	1
New Mexico	1
Oregon	1
Washington	1
Mumps:	
Alabama	353
Georgia	178
Idaho	83
Illinois	1,497
Iowa	158
Kansas	522
Mississippi	510
Montana	196
Nevada	7
New Mexico	95
Oklahoma [1]	23
Oregon	276
South Dakota	11
Washington	246

[1] Exclusive of Oklahoma City and Tulsa.

	Cases
Ophthalmia neonatorum:	
Illinois	15
Kansas	1
Oklahoma [1]	1
Paratyphoid fever:	
Illinois	1
Kansas	1
Oregon	1
Psittacosis:	
Georgia	1
Ptomaine poisoning:	
Kansas	17
Puerperal septicemia:	
Illinois	5
Mississippi	35
Rabies in animals:	
Mississippi	5
Rocky Mountain spotted or tick fever:	
Idaho	4
Montana	4
Nevada	1
Oregon	4
Scabies:	
Kansas	4
Oregon	1
Washington	5
Septic sore throat:	
Georgia	46
Illinois	8
Iowa	2
Kansas	3
Montana	5
New Mexico	4
Oklahoma [1]	34
Oregon	2
South Dakota	1
Tetanus:	
Georgia	1
Illinois	2
Trachoma:	
Illinois	7
Mississippi	12
Montana	128
New Mexico	3
Oklahoma [1]	2
South Dakota	3
Tularaemia:	
Alabama	1
Illinois	7
Virginia	1
Typhus fever:	
Alabama	1
Georgia	1
Undulant fever:	
Illinois	15
Iowa	2
Kansas	1
Washington	2
Vincent's angina:	
Illinois	2
Kansas	6
New Mexico	3
Oklahoma [1]	3
Oregon	12

Whooping cough:	Cases
Alabama	77
Georgia	131
Idaho	179
Illinois	657
Iowa	85
Kansas	122
Mississippi	391
Montana	173
Whooping cough—Continued.	
Nevada	2
New Mexico	32
Oklahoma [1]	61
Oregon	50
South Dakota	41
Virginia	519
Washington	260

[1] Exclusive of Oklahoma City and Tulsa.

Cases of Certain Communicable Diseases Reported for the Month of January, 1931, by State Health Officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	396	16	112	380	106	0	46	12	503
New Hampshire		10			23			3	
Vermont	240	9	107	68	33	17	[1] 17	1	93
Massachusetts	1,897	337	2,483	453	1,413	6	533	16	805
Rhode Island	97	28	2	33	225	0	53	1	44
Connecticut	577	55	1,044	380	265	0	135	2	279
New York	3,212	553	1,461	1,222	2,880	29	1,627	40	2,095
New Jersey	1,935	281	1,715	154	1,064	0	471	10	699
Pennsylvania	5,391	684	4,887	1,400	2,604	5	521	59	822
Ohio	2,849	292	867	962	2,345	388	618	43	413
Indiana	676	257	1,253	61	1,559	495	331	7	236
Illinois	1,785	665	3,032	1,433	2,126	211	1,041	23	578
Michigan	1,862	219	582	381	1,365	226	555	19	810
Wisconsin	2,452	114	1,208	2,000	695	34	160	10	667
Minnesota	675	62	133		288	44	228	12	147
Iowa	324	46	16	60	541	216	46	2	75
Missouri	583	272	6,002	89	987	190	197	26	114
North Dakota	169	23	21	60	145	44	16	4	73
South Dakota	129	80	32	49	83	202	2	6	35
Nebraska	340	39	84	278	230	288	[1] 27	6	129
Kansas	804	76	141	199	260	507	129	9	126
Delaware	39	17	22	11	135	0	27	0	25
Maryland	1,040	112	879	147	407	0	191	16	145
District of Columbia	187	51	85		140	0	75	5	40
Virginia	803	184	1,031		369	6	257	28	424
West Virginia	276	74	152		227	65	61	33	209
North Carolina	1,031	169	526		326	11		16	374
South Carolina	306	230	97	113	82	4	134	29	149
Georgia	180	71	382	116	246	15	113	19	112
Florida	154	44	228	2	40	6	23	5	29
Kentucky [2]									
Tennessee	450	105	712	133	428	43	197	40	108
Alabama	458	195	1,945	150	293	14	343	33	57
Mississippi	905	89	116	629	122	77	165	21	517
Arkansas	121	36	17	34	77	91	[1] 24	22	11
Louisiana	50	142	10	11	104	38	[1] 130	24	75
Oklahoma [3]	169	160	172	27	204	453	54	35	24
Texas		195			248			36	
Montana	165	19	18	138	243	27	36	6	199
Idaho		24			89			12	
Wyoming	183	2	4	89	106	3		0	68
Colorado	444	36	344	163	201	00	76	7	153
New Mexico	83	21	202	77	38	8	47	8	29
Arizona	57	34	379	26	28	15	160	4	15
Utah [2]									
Nevada	2	4	3		6		[1] 6		10
Washington	613	71	332	271	239	141	102	11	284
Oregon	247	26	380	344	95	99	50	4	40
California	2,224	267	1,840	1,097	567	453	938	41	687

[1] Pulmonary. [2] Reports received weekly. [3] Exclusive of Oklahoma City and Tulsa.

Case Rates per 100,000 Population (Annual Basis) for the Month of January, 1931

State	Chickenpox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	582	24	165	559	156	0	68	18	739
New Hampshire	------	25	------	------	58	0	------	8	------
Vermont	784	29	349	222	108	0	[1] 56	3	304
Massachusetts	520	92	680	124	387	2	146	4	221
Rhode Island	164	47	3	56	380	0	89	2	74
Connecticut	416	40	752	274	191	0	97	1	201
New York	294	51	134	112	261	3	149	4	192
New Jersey	549	80	487	44	302	0	134	3	198
Pennsylvania	652	83	591	169	315	1	63	7	99
Ohio	497	51	151	168	409	68	108	7	72
Indiana	243	92	450	22	560	178	119	3	85
Illinois	270	101	459	217	322	32	158	3	88
Michigan	410	52	137	90	322	53	131	4	191
Wisconsin	970	45	478	791	275	13	63	4	264
Minnesota	307	28	61	------	131	20	104	5	67
Iowa	154	22	8	28	257	103	22	1	36
Missouri	188	88	1,933	29	318	61	63	8	37
North Dakota	290	40	36	103	249	76	28	7	125
South Dakota	217	135	54	82	140	340	3	10	59
Nebraska	288	33	71	236	195	244	[1] 23	5	109
Kansas	500	47	88	124	162	315	80	6	78
Delaware	191	83	108	54	662	0	132	0	123
Maryland	740	80	626	105	290	0	136	11	103
District of Columbia	447	122	203	------	334	0	179	12	96
Virginia	388	89	498	------	178	3	124	14	205
West Virginia	184	49	102	------	152	43	41	22	140
North Carolina	374	61	191	------	118	4	------	6	136
South Carolina	206	155	65	76	53	3	90	20	101
Georgia	73	29	155	47	100	6	46	8	45
Florida	119	34	176	2	31	5	18	4	22
Kentucky [2]	------	------	------	------	------	------	------	------	------
Tennessee	203	47	316	59	190	19	88	18	48
Alabama	201	86	854	66	129	6	151	14	25
Mississippi	523	51	67	364	71	45	95	12	299
Arkansas	76	23	11	21	49	57	[1] 15	14	7
Louisiana	28	78	6	6	57	21	[1] 72	13	41
Oklahoma [3]	95	90	97	15	115	255	30	20	13
Texas	------	38	------	------	49	------	------	7	------
Montana	361	42	39	302	532	59	79	13	436
Idaho	------	63	------	------	235	------	------	32	------
Wyoming	939	10	21	457	544	15	------	0	349
Colorado	499	40	387	183	228	67	85	8	172
New Mexico	227	57	552	210	104	22	128	22	79
Arizona	150	89	996	68	74	39	421	11	39
Utah [2]	------	------	------	------	------	------	------	------	------
Nevada	25	51	38	------	76	0	[1] 76	------	127
Washington	454	53	246	201	177	105	76	8	173
Oregon	208	31	459	416	115	120	60	5	48
California	440	53	364	217	112	90	186	8	136

[1] Pulmonary. [2] Reports received weekly. [3] Exclusive of Oklahoma City and Tulsa.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 98 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,480,000. The estimated population of the 91 cities reporting deaths is more than 31,935,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended April 25, 1931, and April 26, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	790	1,138	
98 cities	343	573	757
Measles:			
45 States	20,714	19,567	
98 cities	8,616	8,554	
Meningococcus meningitis:			
46 States	152	223	
98 cities	78	137	
Poliomyelitis:			
46 States	20	18	
Scarlet fever:			
46 States	5,488	4,321	
98 cities	2,603	1,654	1,375
Smallpox:			
46 States	997	1,596	
98 cities	133	188	65
Typhoid fever:			
46 States	137	213	
98 cities	19	39	31
Deaths reported			
Influenza and pneumonia:			
91 cities	919	915	
Smallpox:			
91 cities	1	0	
Memphis, Tenn.	1	0	

City reports for week ended April 25, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during non-epidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
NEW ENGLAND								
Maine:								
Portland	1	0	0		0	0	5	0
New Hampshire:								
Concord	0	0	0		0	14	0	0
Manchester	0	0	0		0	0	0	2
Vermont:								
Barre	0	0	0		0	0	0	1
Burlington	0	0	0		0	1	0	0
Massachusetts:								
Boston	50	30	8	2	0	89	10	30
Fall River	1	2	4		0	6	4	0
Springfield	7	2	0		0	12	17	3
Worcester	23	4	2		0	4	18	1
Rhode Island:								
Pawtucket	2	2	0		0	0	0	1
Providence	8	7	8	1	1	32	12	6
Connecticut:								
Bridgeport	2	4	1	3	1	8	8	1
Hartford	5	4	1		0	30	2	8
New Haven	35	1	0	1	1	340	7	4

City reports for week ended April 25, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MIDDLE ATLANTIC								
New York:								
Buffalo	22	9	9		2	259	61	16
New York	377	223	68	21	9	1,358	0	208
Rochester	14	4	3		0	30	31	8
Syracuse	16	2	0		2	8	1	4
New Jersey:								
Camden	3	6	3		0	12	10	4
Newark	146	14	8	1	1	27	19	8
Trenton	4	3	1		0	8	7	2
Pennsylvania:								
Philadelphia	134	59	11	12	8	1,321	50	55
Pittsburgh	66	14	0	4	4	115	60	62
Reading	3	0	0		0	34	12	2
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	11	6	2		2	112	15	13
Cleveland	194	22	11	25	3	67	370	21
Columbus	17	3	1	1	0	6	1	4
Toledo	45	3	3	2	0	8	27	3
Indiana:								
Fort Wayne	2	2	3		0	17	0	4
Indianapolis	29	3	4		0	570	10	12
South Bend	2	1	0		0	4	0	0
Terre Haute	2	0	0		0	4	0	3
Illinois:								
Chicago	171	86	45	3	3	627	102	63
Springfield	7	1	0	1	0	115	10	1
Michigan:								
Detroit	115	41	23	4	1	22	60	25
Flint	13	2	1		1	0	9	3
Grand Rapids	3	2	0		0	21	1	3
Wisconsin:								
Kenosha	4	0	2		0	1	121	0
Madison	21	0	1			4	58	
Milwaukee	112	10	3		0	192	501	10
Racine	3	2	0		0	11	6	0
Superior	8	0	0		0	0	1	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	7	0	0		0	0	0	0
Minneapolis	62	11	5		1	91	154	11
St. Paul	49	7	0	1	1	10	5	8
Iowa:								
Davenport	0	0	2			0	0	
Des Moines	2	0	2			0	2	
Sioux City	32	0	1			5	17	
Waterloo	2	0	1			0	0	
Missouri:								
Kansas City	17	3	5		0	259	2	16
St. Joseph	1	0	0		1	20	0	13
St. Louis	32	32	20	1	1	45	26	16
North Dakota:								
Fargo	2	0	0		0	2	7	1
Grand Forks	0	0	0			0	2	
South Dakota:								
Aberdeen	3	0	0			9	0	
Nebraska:								
Omaha	16	2	2		0	1	25	7
Kansas:								
Topeka	9	1	1	3	2	0	24	3
Wichita	4	1	0		0	1	1	3
SOUTH ATLANTIC								
Delaware:								
Wilmington	2	2	2		0	81	4	3
Maryland:								
Baltimore	74	22	10	2	1	1,075	39	32
Cumberland	0	0	0		0	0	0	2
Frederick	0	0	0		0	8	0	0

City reports for week ended April 25, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
SOUTH ATLANTIC—con.								
District of Columbia:								
Washington	0	12	8	2	1	287	0	11
Virginia:								
Lynchburg	16	1	0		0	6	3	1
Richmond	2	1	1		0	320	0	8
Roanoke	1	0	0		0	12	0	8
West Virgnia:								
Charleston	0	0	0	2	1	0	1	2
Wheeling	13	1	0		0	0	0	2
North Carolina:								
Raleigh	3	0	0		0	38	0	2
Wilmington	0	0	0		0	1	0	1
Winston-Salem	9	0	2		1	59	17	1
South Carolina:								
Charleston	1	0	0	30	0	1	0	4
Columbia	1	0	0		0	6	6	3
Greenville	0	1	0		0	0	0	0
Georgia:								
Atlanta	7	2	2	7	1	0	0	5
Brunswick	0	0	0		0	0	5	2
Savannah	3	0	0	27	0	13	15	5
Florida:								
Miami	8	2	0		1	10	1	3
Tampa	4	1	1		0	143	5	3
EAST SOUTH CENTRAL								
Kentucky:								
Covington	1	1	2		0	27	0	2
Tennessee:								
Memphis	25	2	1		2	160	4	5
Nashville	0	0	0		3	84	0	4
Alabama:								
Birmingham	8	0	0	4	1	4	2	8
Mobile	0	0	1	4	1	0	0	1
Montgomery	6	0	0			0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	5	0	0			3	0	
Little Rock	6	1	0		3	0	1	2
Louisiana:								
New Orleans	6	9	13	3	2	0	0	9
Shreveport	5	0	0		0	1	8	3
Oklahoma:								
Muskogee	33	0	0	5	0	0	0	0
Oklahoma City	2	1	1		1	2	0	6
Texas:								
Dallas	46	4	5	3	4	2	31	5
Fort Worth	14	1	1		1	0	0	9
Galveston	0	0	0		0	3	0	1
Houston	2	4	3		1	6	1	11
San Antonio	1	3	0		6	26	3	11
MOUNTAIN								
Montana:								
Billings	1	0	0		0	0	0	0
Great Falls	13	0	0		0	0	0	1
Helena	0	0	0		0	0	0	0
Missoula	26	0	0		0	0	0	0
Idaho:								
Boise	0	0	0		0	2	1	0
Colorado:								
Denver	50	8	2		2	26	29	5
Pueblo	0	1	0		0	46	0	1
New Mexico:								
Albuquerque	9	0	0		0	2	0	1
Arizona:								
Phoenix	0	0	0		0	0	0	1
Utah:								
Salt Lake City	8	3	1		0	2	8	4
Nevada:								
Reno	0	0	0		0	0	0	1

City reports for week ended April 25, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
PACIFIC								
Washington:								
Seattle	35	2	1	----------	----------	7	28	----------
Spokane	3	3	0	----------	----------	4	0	----------
Tacoma	6	2	1	----------	0	1	5	4
Oregon:								
Portland	19	7	0	11	0	38	29	4
Salem	0	0	0	----------	0	9	8	0
California:								
Los Angeles	81	29	26	32	0	188	8	7
Sacramento	10	2	1	2	2	20	1	8
San Francisco	36	13	3	12	0	44	3	5

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	4	12	0	0	0	1	1	0	0	7	28
New Hampshire:											
Concord	0	0	0	0	0	1	0	0	0	0	13
Manchester	1	1	0	0	0	0	0	0	0	0	17
Vermont:											
Barre	0	1	0	0	0	2	0	0	0	1	9
Burlington	1	0	1	0	0	0	0	0	0	0	11
Massachusetts:											
Boston	81	107	0	0	0	11	1	0	0	25	239
Fall River	4	11	0	0	0	0	0	1	0	4	30
Springfield	10	20	0	0	0	2	0	0	0	6	31
Worcester	7	21	0	0	0	1	0	0	0	9	63
Rhode Island.											
Pawtucket	1	20	0	0	0	0	0	0	0	0	22
Providence	12	36	0	0	0	2	0	0	0	12	67
Connecticut											
Bridgeport	10	4	0	0	0	2	0	0	0	1	34
Hartford	4	6	0	0	0	4	0	0	0	2	42
New Haven	7	1	0	0	0	2	0	0	0	2	40
MIDDLE ATLANTIC											
New York:											
Buffalo	26	28	0	2	0	7	0	1	0	34	136
New York	305	592	0	0	0	98	8	4	0	188	1, 506
Rochester	11	70	0	0	0	1	0	0	0	20	75
Syracuse	12	34	0	0	0	0	0	0	0	17	59
New Jersey.											
Camden	5	8	0	0	0	0	0	0	0	0	33
Newark	31	72	0	0	0	7	1	0	0	53	102
Trenton	4	7	0	0	0	5	0	1	0	0	36
Pennsylvania:											
Philadelphia	99	216	0	0	0	38	3	1	0	37	536
Pittsburgh	28	63	0	0	0	9	1	1	0	37	221
Reading	5	1	0	0	0	3	0	0	0	0	43
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	19	30	2	0	0	9	0	1	0	8	155
Cleveland	36	89	0	0	0	14	0	0	0	11	207
Columbus	9	18	0	0	0	6	0	1	0	1	88
Toledo	13	4	0	0	0	10	0	0	0	18	72

City reports for week ended April 25, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
EAST NORTH CENTRAL—contd.											
Indiana:											
Fort Wayne	4	0	1	8	0	1	0	0	0	2	25
Indianapolis	9	34	6	19	0	0	0	0	3	38	--------
South Bend	5	1	0	2	0	1	0	0	0	12	23
Terre Haute	2	2	0	0	0	2	0	0	0	0	19
Illinois:											
Chicago	118	289	2	3	0	46	1	1	0	61	734
Springfield	8	5	0	0	0	2	1	0	0	0	20
Michigan:											
Detroit	111	173	1	0	0	19	1	0	0	81	289
Flint	10	10	2	0	0	3	0	0	0	5	32
Grand Rapids	11	16	1	1	0	0	0	0	1	15	32
Wisconsin:											
Kenosha	2	5	1	0	0	0	0	0	0	0	2
Madison	3	1	0	0	--------	--------	0	0	--------	3	--------
Milwaukee	27	31	0	0	0	9	0	0	0	29	94
Racine	4	8	0	0	0	2	0	0	0	11	19
Superior	3	0	0	0	0	0	0	0	0	2	8
WEST NORTH CENTRAL											
Minnesota:											
Duluth	7	0	0	0	0	1	0	0	0	4	14
Minneapolis	33	14	0	0	0	1	0	0	0	30	96
St. Paul	27	11	0	0	0	2	1	0	0	18	65
Iowa:											
Davenport	2	1	1	7	--------	--------	0	0	--------	0	--------
Des Moines	9	7	1	13	--------	--------	0	0	--------	0	22
Sioux City	2	16	1	[1] 1	--------	--------	0	0	--------	6	--------
Waterloo	1	0	0	0	--------	--------	0	0	--------	4	--------
Missouri:											
Kansas City	21	13	1	1	0	3	0	0	0	11	115
St. Joseph	3	8	0	0	0	3	0	0	0	0	39
St. Louis	33	170	2	2	0	21	2	1	0	10	274
North Dakota:											
Fargo	3	1	1	0	0	0	0	0	0	1	5
Grand Forks	1	1	0	0	--------	--------	0	0	--------	0	--------
South Dakota:											
Aberdeen	1	1	0	1	--------	--------	0	0	--------	1	--------
Nebraska:											
Omaha	3	7	4	8	0	3	0	0	0	7	55
Kansas:											
Topeka	3	2	1	0	0	0	0	0	0	1	26
Wichita	3	3	2	25	0	1	0	1	0	2	29
SOUTH ATLANTIC											
Delaware:											
Wilmington	5	11	0	0	0	0	0	0	0	0	30
Maryland:											
Baltimore	37	40	0	0	0	17	2	0	0	23	233
Cumberland	1	0	0	0	0	0	0	0	0	0	14
Frederick	0	2	0	0	0	0	0	0	0	0	4
District of Col.:											
Washington	24	28	0	0	0	10	1	0	0	5	156
Virginia:											
Lynchburg	1	0	0	0	0	2	0	0	0	0	13
Richmond	3	7	0	0	0	0	0	0	0	0	52
Roanoke	1	0	0	0	0	1	0	0	0	0	16
West Virginia:											
Charleston	0	0	0	1	0	0	0	0	0	2	15
Wheeling	2	1	0	0	0	0	0	0	0	2	17
North Carolina:											
Raleigh	0	0	0	0	0	1	0	0	0	31	18
Wilmington	0	0	0	0	0	0	0	0	0	10	13
Winston-Salem	1	1	1	0	0	3	0	0	0	6	17
South Carolina:											
Charleston	0	1	1	0	0	1	0	0	0	0	31
Columbia	0	0	1	0	0	2	0	0	0	0	15
Greenville	0	0	1	0	0	0	0	0	0	1	--------

[1] Nonresident.

City reports for week ended April 25, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
SOUTH ATLANTIC—continued											
Georgia:											
Atlanta	4	62	2	2	0	3	0	0	0	2	86
Brunswick	0	0	0	0	0	0	0	0	0	0	5
Savannah	0	0	1	0	0	0	0	1	0	0	30
Florida:											
Miami	2	2	0	0	0	1	1	0	0	3	27
Tampa	0	1	0	0	0	3	0	0	0	3	21
EAST SOUTH CENTRAL											
Kentucky:											
Covington	3	9	0	0	0	0	0	0	0	0	11
Tennessee											
Memphis	7	48	0	6	1	7	0	0	0	11	75
Nashville	1	9	0	0	0	1	0	0	0	4	53
Alabama:											
Birmingham	2	2	1	0	0	4	0	1	1	3	55
Mobile	0	0	1	0	0	3	0	0	0	0	21
Montgomery	0	0	1	0	....	....	0	0	....	0	....
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	1	0	0	....	....	0	0	....	18	....
Little Rock	0	2	0	0	0	3	0	0	0	1	10
Louisiana											
New Orleans	10	17	0	24	0	14	3	0	0	8	152
Shreveport	1	1	0	0	0	0	0	0	0	2	28
Oklahoma.											
Muskogee	1	1	2	0	0	0	0	2	0	0	....
Oklahoma City	2	3	3	8	0	4	0	0	0	0	37
Texas:											
Dallas	4	6	2	2	0	1	1	0	0	9	52
Fort Worth	2	2	4	7	0	4	0	1	0	0	47
Galveston	1	0	0	0	0	2	0	0	0	0	16
Houston	1	1	2	3	0	4	0	0	0	0	80
San Antonio	1	1	1	0	0	16	0	0	0	1	88
MOUNTAIN											
Montana:											
Billings	1	2	0	0	0	0	0	0	0	1	4
Great Falls	1	0	0	0	0	0	0	0	0	17	6
Helena	0	0	0	1	0	0	0	0	0	0	4
Missoula	1	0	1	0	0	0	0	0	0	0	6
Idaho.											
Boise	2	0	0	0	0	0	0	0	0	3	6
Colorado:											
Denver	11	17	0	1	0	9	0	0	0	33	77
Pueblo	1	0	0	0	0	0	0	0	0	7	9
New Mexico:											
Albuquerque	1	0	0	0	0	4	0	1	0	0	8
Arizona:											
Phoenix	1	1	0	0	0	3	0	0	0	0	....
Utah:											
Salt Lake City	2	3	1	0	0	2	1	1	0	36	36
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	4
PACIFIC											
Washington:											
Seattle	7	6	3	1	....	....	1	0	....	84	....
Spokane	5	1	7	11	....	....	0	0	....	2	....
Tacoma	2	1	3	0	0	1	0	0	0	5	25
Oregon:											
Portland	3	1	9	5	0	1	0	0	0	1	74
Salem	0	0	1	1	0	0	0	0	0	0	....
California:											
Los Angeles	31	26	6	6	0	30	1	0	0	36	277
Sacramento	2	3	1	0	0	2	0	1	0	27	29
San Francisco	20	7	1	3	0	12	0	1	0	17	199

City reports for week ended April 25, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
NEW ENGLAND									
Massachusetts:									
Worcester	0	0	0	0	0	0	0	1	0
Connecticut:									
Hartford	2	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	1	0	0	0	0	0	0	0
New York	3	5	0	0	0	0	1	1	0
New Jersey:									
Newark	0	0	1	0	0	0	0	0	0
Trenton	0	0	1	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	6	5	0	0	0	0	0	0	0
Pittsburgh	3	1	0	0	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	1	0	1	0	0	0	0	0
Cleveland	1	1	0	0	0	0	0	0	0
Columbus	1	0	0	0	0	0	0	0	0
Indiana:									
Indianapolis	2	1	0	0	0	0	0	0	0
Illinois:									
Chicago	20	7	1	1	0	0	0	0	0
Springfield	1	0	0	0	0	0	0	0	0
Michigan:									
Detroit	5	4	2	1	0	0	0	0	0
Grand Rapids	1	1	0	0	0	0	0	1	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	2	0	0	0	0	0	0	0	0
Iowa:									
Waterloo	1	1	0	0	0	0	0	0	0
Missouri:									
Kansas City	1	1	0	0	0	0	0	0	0
St. Joseph	1	0	0	0	0	0	0	0	0
St. Louis	9	2	0	0	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	0	0	1	0	0	0	0	0
District of Columbia:									
Washington	1	3	0	0	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	1	0	0	0	0
South Carolina:									
Charleston	0	0	0	0	4	0	0	1	1
Columbia	3	2	0	0	0	0	0	0	0
Georgia:									
Atlanta	2	0	0	0	4	4	0	0	0
Savannah	0	0	0	0	4	1	0	0	0
Florida:									
Miami	0	0	0	0	1	0	1	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	1	1	0	0	1	0	0	0	0
Nashville	0	1	0	0	0	0	0	0	0
Alabama:									
Mobile	0	0	0	0	0	1	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	2	0	0	0
Louisiana:									
New Orleans	2	2	0	0	0	0	0	0	0
Shreveport	0	0	0	0	0	1	0	0	0
Oklahoma:									
Oklahoma City	4	0	0	1	0	0	0	0	0
Texas:									
Dallas [1]	1	1	0	0	1	2	0	0	0
Fort Worth [1]	1	0	0	0	0	0	0	0	0
Houston	0	0	0	0	0	2	0	0	0
San Antonio	2	1	0	0	0	0	0	0	0

[1] Typhus fever: 2 cases; 1 case at Dallas and 1 at Fort Worth, Tex.

City reports for week ended April 25, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
MOUNTAIN									
Utah:									
Salt Lake City	1	2	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Seattle	1	0	0	0	0	0	0	0	0
California:									
Los Angeles	2	1	0	0	0	0	0	2	0
San Francisco	2	0	0	0	0	0	0	2	0

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended April 25, 1931, compared with those for a like period ended April 26, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, March 22 to April 25, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Mar. 28, 1931	Mar. 29, 1930	Apr. 4, 1931	Apr. 5, 1930	Apr. 11, 1931	Apr. 12, 1930	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr. 26, 1930
98 cities	78	82	53	79	65	93	66	86	53	91
New England	70	56	46	68	84	82	79	119	58	85
Middle Atlantic	63	80	48	74	59	92	62	83	46	99
East North Central	82	114	64	107	86	115	83	96	58	113
West North Central	163	61	42	52	63	89	63	87	67	68
South Atlantic	61	70	47	64	49	80	65	64	51	64
East South Central	76	48	29	30	17	6	23	18	23	48
West South Central	64	125	85	139	54	153	74	206	71	101
Mountain	87	44	44	26	35	79	17	9	26	88
Pacific	69	34	53	51	57	51	43	36	63	49

MEASLES CASE RATES

98 cities	1,208	879	1,122	1,004	1,326	1,195	1,316	1,227	1,342	1,356
New England	1,479	1,117	1,106	1,449	1,503	1,562	1,349	1,628	1,286	1,710
Middle Atlantic	1,321	611	1,250	789	1,422	966	1,543	1,097	1,418	1,192
East North Central	723	654	727	799	831	904	790	1,074	1,075	909
West North Central	650	908	532	860	704	1,199	589	1,009	830	1,352
South Atlantic	3,879	697	3,808	867	4,546	1,067	4,343	1,089	4,049	1,306
East South Central	1,635	968	1,501	526	1,751	329	1,612	299	1,600	407
West South Central	47	784	88	731	68	721	101	502	139	592
Mountain	1,140	2,987	661	4,731	844	7,674	923	6,793	661	8,802
Pacific	519	2,184	358	2,008	499	2,059	417	1,800	517	2,067

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931 and 1930, respectively.

Summary of weekly reports from cities, March 22 to April 25, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

SCARLET FEVER CASE RATES

	Week ended—									
	Mar. 28, 1931	Mar. 29, 1930	Apr. 4, 1931	Apr. 5, 1930	Apr. 11, 1931	Apr. 12, 1930	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr. 26, 1930
98 cities	402	308	371	301	362	320	382	298	405	262
New England	697	363	577	462	474	351	584	402	575	348
Middle Atlantic	454	299	404	293	413	281	415	262	488	239
East North Central	378	383	378	377	338	430	383	391	432	360
West North Central	580	306	585	271	537	399	518	366	469	248
South Atlantic	310	272	290	276	355	308	306	302	304	248
East South Central	559	233	396	143	465	132	582	143	396	126
West South Central	78	111	95	157	105	108	112	115	98	59
Mountain	209	458	157	238	174	335	278	352	191	229
Pacific	104	204	92	163	104	217	116	144	86	176

SMALLPOX CASE RATES

98 cities	17	22	14	23	19	29	22	27	21	30
New England	0	2	0	0	0	2	0	2	0	0
Middle Atlantic	0	0	0	0	1	0	2	0	1	0
East North Central	7	17	9	30	6	23	19	23	20	18
West North Central	99	99	78	87	96	149	92	139	71	145
South Atlantic	4	8	2	2	18	10	10	4	6	0
East South Central	12	18	12	0	0	12	52	18	35	42
West South Central	78	45	71	17	81	28	95	70	98	38
Mountain	44	26	0	106	17	62	9	26	17	97
Pacific	22	71	16	71	53	89	27	71	41	109

TYPHOID FEVER CASE RATES

98 cities	4	3	4	4	5	5	5	6	3	6
New England	2	2	2	5	2	0	2	7	2	5
Middle Atlantic	2	15	3	3	5	1	4	2	4	5
East North Central	2	3	2	2	3	1	2	2	2	6
West North Central	2	4	4	2	0	4	4	8	4	4
South Atlantic	12	6	14	4	16	22	8	22	2	12
East South Central	0	30	0	30	6	18	12	6	6	0
West South Central	7	7	10	10	3	7	7	7	0	24
Mountain	0	0	9	18	0	44	9	18	9	0
Pacific	10	2	2	6	8	4	10	8	4	4

INFLUENZA DEATH RATES

91 cities	29	14	23	13	18	16	17	15	13	12
New England	14	10	2	7	19	7	7	7	7	12
Middle Atlantic	20	10	17	14	12	20	12	14	12	9
East North Central	25	11	18	10	14	8	10	12	6	14
West North Central	35	6	12	9	15	9	29	18	18	9
South Atlantic	32	16	39	8	30	26	32	22	10	12
East South Central	126	97	126	39	69	45	76	58	44	39
West South Central	55	32	69	36	45	25	45	25	55	25
Mountain	61	53	26	26	17	26	17	9	17	18
Pacific	41	2	14	0	19	12	10	2	5	0

PNEUMONIA DEATH RATES

91 cities	180	163	171	161	155	164	161	149	137	140
New England	156	220	127	181	173	186	144	160	132	189
Middle Atlantic	220	187	223	184	168	185	180	180	165	160
East North Central	125	117	120	146	118	127	128	114	98	108
West North Central	171	135	150	117	253	150	244	156	230	81
South Atlantic	263	212	221	196	199	230	188	202	168	210
East South Central	189	227	170	155	176	201	290	207	126	227
West South Central	211	164	238	164	169	181	173	121	145	132
Mountain	131	176	157	185	191	185	113	167	104	150
Pacific	98	92	53	62	60	72	67	37	46	50

FOREIGN AND INSULAR

AUSTRALIA

Vital statistics—Year, 1929.—During the year 1929, 129,480 births were recorded in Australia, giving a birth rate of 20.30 per 1,000 population. There were 60,857 deaths registered, a rate of 9.55 per 1,000 population.

CANADA

Provinces—Communicable diseases—Week ended April 25, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended April 25, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia	1				
New Brunswick					1
Quebec					34
Ontario		2		6	9
Manitoba	3				3
Saskatchewan				3	1
Alberta			1		
British Columbia			2		
Total	4	2	3	9	48

[1] No case of any disease included in the table was reported during the week

Quebec Province—Communicable diseases—Week ended April 25, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended April 25, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	107	Paratyphoid fever	1
Diphtheria	15	Scarlet fever	69
Erysipelas	15	Tuberculosis	50
German measles	14	Typhoid fever	34
Measles	528	Whooping cough	21
Mumps	13		

COLOMBIA

Medellin—Meningitis.—According to a report dated May 5, 1931, there was an epidemic of cerebrospinal meningitis in Medellin, Colombia. Twenty cases had been reported. Antimeningococcus serum had been ordered.

CUBA

Provinces—Communicable diseases—Four weeks ended February 14, 1931.—During the four weeks ended February 14, 1931, cases of certain communicable diseases were reported in the Provinces of Cuba, as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer			1		1	1	3
Chicken pox		15	2	55		3	75
Diphtheria	1	18		6	1	3	29
Malaria	2	4		1	6	50	63
Measles		15		17			32
Paratyphoid fever			2		1	4	7
Scarlet fever		6		2			8
Typhoid fever	7	19	3	38	4	19	90

Habana—Communicable diseases—Four weeks ended April 25, 1931.—During the four weeks ended April 25, 1931, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	44		Rabies		1
Diphtheria	8		Scarlet fever	7	
Malaria [1]	2		Tuberculosis	22	4
Measles	67		Typhoid fever [1]	14	1

[1] Many of these cases are from the Island of Cuba, outside of Habana.

JAMAICA

Communicable diseases—Four weeks ended April 25, 1931.—During the four weeks ended April 25, 1931, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the Island of Jamaica, outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis		6	Puerperal fever		6
Chicken pox	5	55	Scarlet fever	6	8
Dysentery	1	4	Tuberculosis	28	67
Leprosy		1	Typhoid fever	9	21

PANAMA CANAL ZONE

Communicable diseases—March, 1931.—During the month of March, 1931, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	25	1	Meningococcus meningitis	3	1
Diphtheria	8	1	Pneumonia		22
Dysentery (amebic)	5		Poliomyelitis	1	
Leprosy	1	2	Scarlet fever	2	
Malaria	105	2	Tuberculosis		31
Measles	84		Whooping cough	9	

PORTO RICO

San Juan—Communicable diseases—Five weeks ended April 11, 1931.—During the five weeks ended April 11, 1931, cases of certain communicable diseases were reported in San Juan, P. R., as follows:

Disease	Cases	Disease	Cases
Diphtheria	5	Measles	2
Influenza	1	Tetanus	2
Malaria	22	Whooping cough	31

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CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases, D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended—											
						February, 1931			March, 1931				April, 1931				May 2, 1931
						14	21	28	7	14	21	28	4	11	18	25	
Ceylon: Colombo	C									1							
China:																	
Canton	C	1												1			
Shanghai	C	2															
India	C	18, 944	11, 112	10, 687	15, 334	3, 529	2, 549										
	D	9, 782	5, 933	5 689	8, 123	1, 846	1, 325										
Bassein	C															2	
	D															2	
Bombay	C	19	13		21									2			
	D	17	7		9									1			
Calcutta	C	33	22	28	121	27	33	45	65	80	102	129	125	95			
	D	16	16	20	86	22	25	26	39	49	68	69	70	55			
Karikal	C			1		4		1	4	2	1	7	2				
	D					4			4	2	1	7	2				
Madras	C	1		201	99	18	20	19	15	4	5	7	4				
	D			67	47	5	4	14	6	5	3	2					
Negapatam	D				3	1		2									
Rangoon	C			1													
	D			1	1												
Tuticorin	C	1	5	1	1		1										
	D	1															
India (French):																	
Chandernagor	C	1	1	2	1		1	2	2	2	2	2					
	D			3	1		1	3	1	2	3	1					
Pondicherry	C	1	4	31	19	10	20	31	39	29	25	28	20	5	3		
	D		4	21	11	10	9	6	9	6	5	4	3	1			
India (Portuguese)	C	14		1													
	D	9															
Indo-China (see also table below).																	
Pnompenh	C	1	2		4		3	3	3					1	1		
	D		2		2		1	2	2		1						
Saigon and Cholon	C	1	3	9	6			3	1	1		1	3	2	3		
	D		1	4	3			3	1	2	1	1	1		3		

Philippine Islands:[1]																	
Iloilo	C		1	1	2												
	D		3	1	2												
Provinces—																	
Capiz	C				59	69	54	28	35	29	11	4	4		3	8	18
	D				47	55	39	23	29	24	10	4	3		3	8	13
Iloilo	C	30	45	28	145	27	42	10	16	2	5						
	D	23	27	22	110	21	22	11	11	2	2						
Masbate	C									21							
	D									9							
Negros, Occidental	C	56	163	120	90	1	1	2									
	D	41	123	97	56	1	1	2									
Negros, Oriental	C				1												
	D				1												
Samar	C	16	8	17													
	D	12	8	9													
Sorsogon	C	5															
	D	4															
Siam	C	4	6	2	3		1				4	4	2				
	D	4	6	2	1						1	1					
Ayudhaya District	C												1				
Bangkok	C	3	4	2	3	1			1		1	1		1			
	D	2	4	2	1				1		1	1					
Bismulok Province	C										4	4					
	D										1	1					

Place		September, 1930	October, 1930	November, 1930	December, 1930			January, 1931			February, 1931			March, 1931		
					1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-28	1-10	11-20	21-31
Indo-China (French) (see also table above):																
Cambodia[2]	C	38	22	26	28			7	19	36		35				65
Cochin-China[2]	C	33	28	13	8			7	4	13		5				33

[1] Figures for cholera in the Philippine Islands are subject to correction.
[2] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec 13, 1930	Dec 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931: 14	21	28	March, 1931: 7	14	21	28	April, 1931: 4	11	18	25	May 2, 1931
Algeria:																	
Algiers	C	11	2	1	2	1							1				
	D	3											1				
Bone	C				1												
Constantine, vicinity of	C	1		50	1	1											
	D				1												
Oran	C	2															
	D	1															
Plague-infected rats		1															
Philippeville	C	2		1													
	D			1													
Argentina:																	
Cordoba Province	C				1		2										
Entre Rios Province—Diamante	C							2									
Jujuy Province—Palpala	C				1		1										
Santa Fe	C						2										
Belgian Congo	C	1	1								2						
	D	1	1								2						
British East Africa (see also table below):																	
Tanganyika	C		3	2				15	7								
	D		3	2				4									
Uganda	C	171	111	67	25	6	4		5	4							
	D	168	112	67	24	6	4		5	4							
Ceylon: Colombo	C	1	9	9	8	6	2	1	2	1	3	3	1	1			
	D	1	8	9	6	7	2	1	3	1	3	2	1	1			
Plague-infected rats		1	2		2	1	1	1			3	1			1		
China: Shensi	C	1															
Dutch East Indies:																	
Batavia and West Java	C	143	208	239	180	29	36	46	30	18	31						
	D	146	206	238	168	29	35	46	28	17	28						
East Java and Madura	C				4			1		1							
	D				4			1		1							
Java and Madura	D	501	557	615	427	89	108	99	80	65	81	68	63				

Egypt:																	
Alexandria	C	7	4	3	1	1			1	1							
	D	7	1														
Plague-infected rats			3	1	1		1										
Assiout	C	3	9	7	26	9		17	15	6	10	1	1	5	16	8	3
	D	1	1	1	6	4		3	4		4	1	1		11	4	2
Aswan	C		3														
Beni-Suef	C				1											10	2
	D				1											3	
Cairo	C												1				
Deirout	C				21	6	10										3
	D				4		4										1
Gharbieh	C				1												
	D				1												
Girga	C			7	1						14	37	35	31	9	4	
	D			2	1						2	5	17	13	3	5	1
Kena	C											5				3	
	D											2				1	
Manfalut	C			23	30	11		2	2	3	5	9					
	D			5	6	4		1			2	1					
Minieh	C		1		2						2	1			1		
	D				1						1	1					
Port Said	C	2															
France: Marseille	C	4															
Greece (see table below).																	
India	C	2,721	3,259	3,740	5,335	1,270	1,095										
	D	1,497	1,856	2,226	3,422	862	774										
Bassein	C	1		2	4				1								
	D			1	3	1											
Bombay	C	1			1	1				1	1	1	1	4			
	D	1			1	1					2	1		4			
Plague-infected rats		30	32	38	34	14		8	10	17	14	21	13	34			
Calcutta	C													1			
	D													1			
Madras Presidency	C	185	148	220	312	30	19	13	12	9							
	D	124	78	154	182	17	18	7	4	4							
Rangoon	C	2		2	2							1		1			
	D	1		1	1							1		1			
Plague-infected rats		1	4	2	4		8						1	1			
India (Portuguese)	C	3															
	D	3															
Indo-China (see also table below): Pnompenh	C		6	1	7				1								
	D	1	6	1	7		1	2	1	2	1	1	2	2			
Iraq: Baghdad	C	P	4		5			1	2	1	3	3	1		5	10	
	D		2		4				2		3	1	1		2	5	
Madagascar (see also table below): Tamatave	C	5	4	2	9												
	D	3	3														
Morocco	C	5		19	13												
	D			8	4												
Nigeria: Lagos	C	38	9	5	1									2			
	D	5	9	5	1									2			
Plague-infected rats		13	5	5													

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931			March, 1931				April, 1931				May 2, 1931
						14	21	28	7	14	21	28	4	11	18	25	
Peru (see table below).																	
Senegal (see table below).																	
Siam	C	6			4	5	9	3	1	2	2						
	D	5			2	4	6	4		1	1						
Bangkok	C	1	1	3	8	1	2	3		29							
	D	1	1	3	8		1	4		6							
Nagara Rajsima	C	1	11	17	9	7						1					
	D	1	9	10	10	6											
Syria: Beirut	C	6		1	1		1										
Tripolitania	C	1	13		8		1			1							
	D		1		3												
Tunisia: Tunis	C	1	P	13	1		9	2	3		5		5	5			
	D						7						4	4			
Union of Socialist Soviet Republics:																	
Gouranduz	D				28												
Transcaucasia—Karabakh	C				6												
Union of South Africa:																	
Cape Province	C	1	P														
Orange Free State	C			2	P	P	1	P		2							
	D			2			1										
On vessel: S. S. Marionga de Thermiotis at Avonmouth	C			1													

Place		Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931
British East Africa (see also table above):							
Kenya	C	87	53	58	62	50	69
Greece	C			2			
Indo-China (see also table above)	C	2	5	2	5	1	
Madagascar (see also table above):							
Ambositra Province	C			4	44	95	100
	D			4	44	87	96
Antisirabe Province	C	11	21	3	18	27	66
	D	11	21	3	18	26	57
Miarinarivo Province	C	2	7	18	12	18	28
	D	2	7	18	12	18	26
Moramanga Province	C	27	18	20	19	13	7
	D	27	17	20	19	11	5
Tananarive Province	C	39	79	125	170	178	92
	D	38	79	116	164	172	89

Place		Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931
Peru	C	21	10	42	34	8	
	D	8	2	20	14		
Senegal:							
Baol[1]	C	79	48	53			
	D	20	23	35	4		
Dakar[1]	C	108	3				
	D	90	8				
Louga[1]	C	75	61	37	10		
	D	33	30	25	3		
Thies[1]	C	34	12	21	27	2	
	D	20	4	15	23	1	
Tivaouane[1]	C	110	20	53	31	2	
	D	54	14	31	25	1	

SMALLPOX

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931: 17	24	31	February, 1931: 7	14	21	28	March, 1931: 7	14	21	28	April, 1931: 4	11	18	25
Algeria:																			
Algiers	C			1				1		1					2			2	
Bone	C						1												
Constantine	C	1												1					
Oran	C		3																
Arabia: Aden	C							1	1										
Belgian Congo	C			79	27	23													
Belgium	C								1										
Brazil:																			
Porto Alegre (alastrim)	C	28	36			3			1	1	2	3	7						
Rio de Janeiro	C	2																	
British East Africa (see also table below): Tanganyika	C	17	385	84	21	25	18	6	35	42	13	1	6						
	D	1	36	4	1	1	2	1		12	1		1						

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended—															
					January, 1931			February, 1931				March, 1931				April, 1931			
					17	24	31	7	14	21	28	7	14	21	28	4	11	18	25
British South Africa: Southern Rhodesia	C	95	18	18	2	1													
	D		3																
Canada:																			
Alberta	C		1	19		7			1										
British Columbia	C	3	1	3				2	1	2	5								
Manitoba	C						1				1								
Winnipeg	C			1							1								
Nova Scotia	C						1								1				
Ontario	C	59	23	17	10	3	32	4	10	4	7	8	2	3	3	1	4		6
Kingston	C			6	1					1									
North Bay	C			2					1										
Ottawa	C	37	12	2	1	1	1			1									
Sault Ste. Marie	C			1	11	8	5	6			2						3	1	
Toronto	C		4										1		1			4	
Quebec	C		2			2													
Saskatchewan	C	2	18		7	6	5	20	17	18	18	10	40	10	8		5	16	3
Regina	C									1					2				2
Canary Islands: Las Palmas	C														1				
China:																			
Canton	C								2			1	1	2	2	2	1		
Chungking	C	P	P	2															
Foochow	C	P	P	P		P		P		P		P		P					
Hong Kong	C			1		1			2	5		2			1	1		1	
	D								1	1	1				2				
Manchuria—																			
Harbin	C	1					1				4		1						
Kwantung—Dairen	C		4	1											2				1
	D		1																
Nanking	C	P	P	P	P		P	P	P	P	P	P		P	P				
Shanghai—																			
Foreigners only	C	2	8	14	1	1	6	4	4	7	2	3	3	1	1	1	2		7
Including natives	D	1	4	11	2	4	4	3	5	2	4	3	5	2	2	1	2		
Swatow	D	3	3	5	1	1	3	2		3	3	7	3	6	9	8	3		
Tientsin	C	1	2		1														
Chosen (see table below).																			

Colombia: Cali	D		1																
Dutch East Indies:																			
Java—Batavia and West Java	C	26	6	4		28		1		2			1						
	D	4	2	2		1		1	1										
Sanggi Islands	C	29																	
	D	3																	
France (see table below).																			
Great Britain:																			
England and Wales	C	372	508	665	187	272	286	213	221	50	247	227	171	219	226	179	177	163	
Bradford	C	1	1	1		1		3		1				1		1	1		
Leeds	C	2		2												1		1	
London	C	172	184	161	45	47	33	24	23	16	23	36	26	54	32	35	51	39	
London and Great Towns	C	296	433	560	154	198	194	147	150	186	189	158	117	154	166	117	142	126	
	D	1	1							1									
Sheffield	C					1	1	1		16	6	10	2	1	6	1	4	2	
Stoke-on-Trent	C	1				1						1							
Greece (see table below).																			
Honduras:																			
Amapala	C											1							
Ocotopeque and Gracias districts	C											P							
Puerto Castilla	C			4	7	1		3	3										
Tegucigalpa	C																		1
Tela	C																1		
India	C	2,412	3,627	5,623	2,068	2,396	2,477	2,682	2,996	2,766									
	D	606	874	1,381	497	496	523	739	665	620									
Bombay	C		1	2	2	2	2	1		1	3	2	4	1	4	1	2		
	D		1	2			1			1	1	1		1	2	1	1		
Calcutta	C	9	18	59	28	28	40	47	35	51	83	82	53	69	75	86	101		
	D	7	11	40	16	22	29	33	26	41	66	55	36	54	50	63	78		
Cochin	C	25	22	15	5	6	8	10	19		16	24	15	17	14		10		
	D	3	4	1					1		1	1							
Karachi	C		3				2	1			4			3					
	D		1				1	1							2				
Madras	C	9	20	4	4	7	3	2	4	1	3	1	6	3	9	4	12		
	D	2	3							1				2	1		2		
Moulmein	C					2													
Negapatam	C	9	6														1		
Rangoon	C	1	1						2		1	1	1	1	1		2		
	D	1											1						
Vizagapatam	C							1			8		1		1		2		
	D										2				1		1		
India (French):																			
Chandernagor	C	3		5	3	2	1	3	2		6	6	3	3	6	2			
	D	1		3	1						1					2			
Karikal	C			3	1	2		2	2		16	1			3				
	D			2		2		2	2		16								
Pondicherry Province	C	11	19	34	16	8	13	8	1	1	10	7	7		4	3	3		
	D	11	17	32	16	8	13	8	1	1	10	7	7		4	3	3	3	
India (Portuguese)	C			4	1	4			2	3	6	3							
	D								2		1								

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931			February, 1931				March, 1931				April, 1931			
					17	24	31	7	14	21	28	7	14	21	28	4	11	18	25
Indo-China (see also table below):																			
Pnompenh	C		1	2				1					1						
	D		1					1											
Saigon and Cholon	C	2	2		3	1		2		2	2		4	1	1		1		
	D	2	2		2			2			1		3	1	2	2	1		
Iraq:																			
Baghdad	C										3	6							
Mosul Liwa	C	6	16	1		2		1		5									
	D		2							1									
Ivory Coast (see table below).																			
Japan:																			
Kobe	C										1	1							
Taiwan	C							1											
Mexico (see also table below):																			
Jalisco (State)—Guadalajara	D	3	3			1									1				
Juarez	D	1																	
Mexico City and surrounding territory	C	9	6	10					7	5		11	13	13	7		17		
	D	2	6	6				1	1	3	2	2	5	5	6	8	4		
Vera Cruz	C	1							1		1	1		1	1			1	
Morocco (see table below).																			
Nicaragua: Porto Cabezas	C			2															
Nigeria: Lagos	C														2				
Panama Canal Zone	C						2												
Poland	C	8	3	25						1									
Portugal: Lisbon	C	20	37	72	27	31	15	30		12	19	9	16	15	17	4	8	18	
Siam	C			1	1	1	1	1	1	1									
Somaliland, British: Boales	C	1	1																
	D			1															
Spain	C	P	P	P			P	P	P	P	P	P	P	P	P				
Straits Settlements	C	10	17	6	3	1	2	1			2				2	1	1		
	D	2	7	3			1				1				1		1		
Sudan (Anglo-Egyptian)	C	5	50	64	1	7		3	1	1	44	51	3	1	4				
	D	1	5	6		7					6	4		1	1				
Sudan (French) (see table below).																			
Syria (see table below).																			

Tunisia: Tunis	C			17	6	1	1								4				
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P				P				P							
Orange Free State	C	2	P					P			P	P			P				
Transvaal	C	P	P	P	P	P	P	P	P	P	P	P	P		P				
Upper Volta	C		6	4						8	10				3			3	
	D			2											1				
On vessel:																			
S. S. Clan Mactoggart at Suez	C								2										
S. S. Muncaster Castle at Manila from Hong Kong	C			1															
S. S. Matheran at Suez from Calcutta	C					1													
S. S. Clan Buchanan at Suez	C										2								
S. S. Rotterdam at Naples from Venice	C														1				
S. S. Clan McTavish at Manila from Chittagong	C																	1	
S. S. Benvenne at Sydney from Shanghai	C				1														

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
British East Africa (see also table above):							
Kenya	C	186		424		653	
Chosen	C	65	35	3	22		
	D	21	15	5	6		
France	C	1					

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
Greece	C	1	6				4
Mexico (see also table above)	D	659	718	822	893		1
Morocco	C	3	8	4	4	20	25
Turkey	C	51	21	19	74	65	116
	D	13	4	2	1	1	9

Place		September, 1930	October, 1930	November, 1930	December, 1930			January, 1931			February, 1931			March, 1931		
					1–10	11–20	21–31	1–10	11–20	21–31	1–10	11–20	21–28	1–10	11–20	21–31
Indo-China (see also table above)	C	192	258	86	38	9	14		48	46		46				139
Ivory Coast	C		4	2	9											
Sudan (French)	C	P	17		43		96							4		P
	D		2		16		4									
Syria: Beirut	C								1							

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec 13, 1930	Dec. 14, 1930–Jan 10, 1931	Week ended— January, 1931: 17	24	31	February, 1931: 7	14	21	28	March, 1931: 7	14	21	28	April, 1931: 4	11	18
Algeria:																		
Algiers	C	1	2						1	1					3			
Constantine Department	C	1	2	6		6	6	19			4			1		2	2	
Oran	C		5			1	2					1						
Australia; western	C															1		
Bulgaria	C	3	11	3	9	2	1	1		2		3				9		
	D			1												2		
Chile: Valparaiso	D													1				
China:																		
Canton	C					2							1					
Manchuria—Harbin (see also table below)	C		1			3					5							
Shanghai	C					2												
Tientsin	C		1															
Chosen (seen table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C	2	2															1
	D	2																
Beheira Province	C			1													3	
	D			1													2	
Cairo	C		1	1				1										
Port Said	C	2				1												
Eritrea: Asmara	C												1					
Great Britain: Scotland	C							1										
Glasgow	C						2											
	D						1											
Greece (see table below).																		
Guatemala.[1]																		
Iraq: Baghdad	C								2	1	1	1	1					
	D								1									
Irish Free State: Mayo County, Belmullet	C																	1
Latvia (see table below).																		
Lithuania (see table below).																		

Mexico (see also table below):																		
Durango	D						1										1	
Mexico City, including municipalities in Federal District	C	11	14	12	13	12	6	8	13	13	9		46	66	73	31	67	
	D	4	7	10	8	9	9	8	4	7	5		20	13	31	20	18	
San Luis Potosi	D		2						2	2		1	1	1	2	1	1	2
Morocco	C	3	1	8			6	2	7	8	5	8	2	2	3			
	D					2				1								
Palestine	C	3	7	4	1	1			3				2	1	1	1	1	
Paraguay: Asuncion	D					2	2											
Poland	C	37	42	63	19	21	16	50	49	41	43	56	62	58	85	82	93	176
	D		7	3	2	1	4	1	3	3	4	9	4		7	4	8	7
Portugal: Oporto	C	4	6			1												
Rumania	C	41	34	113	54	43	51	45	49	53	12	38	55					
	D	2	3	5	1	7	6	2	5	11	3	5	4					
Spain	C	4	1															
	D		1															
Tunisia:																		
Sheitla, vicinity of	C															20		
	D															7		
Sfax	C														2			
Tunis	C		28			7	4	[illegible]			6	12	5	2	7		2	
Turkey (see table below).																		
Union of South Africa.																		
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	1					
Municipality of East London	C	1	1	3		1	1	1										
Natal	C	P		P	P	P	P	P	P	P				1				
Orange Free State	C	P		P	P	P	P	P	P		P	P	P					
Transvaal	C	P	P	P	P	P	P	P	P	P	P	P	P					
Yugoslavia (see table below)																		

Place		Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Place		Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931
China: Harbin (see also table above)	C		3					Lithuania	C	24	1	5	6	26	3
Chosen: Seoul	C	1	7	1	1	1			D	2		1	3	3	1
Czechoslovakia	C			16	24	60		Mexico (see also table above)	D	47	47				
Greece	C	4	4	4	10	10	17	Turkey	C		28	3	2		18
Latvia	C	2						Yugoslavia	C		2	2	1	20	
									D		1		1	2	

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reports an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

	Cases	Deaths
Brazil:		
Bahia State—		
Mar. 14, 1931	1	
Mar. 15–21, 1931	1	
Ceara State—Mar. 14, 1931	2	
Barbalha, Feb. 7, 1931	1	1
Minas Geraes State—		
Mar. 20, 1931	2	
Apr. 5–11, 1931	1	
Apr. 19–25, 1931	2	1
Rio de Janeiro State—		
Mar. 7, 1931	1	1
Mar. 14, 1931	1	1
Mar. 21, 1931	1	1
Brazil—Continued.		
Rio de Janeiro State—Continued.		
Cambucy—		
Jan. 1–25, 1931	3	3
Feb. 1–7, 1931	1	1
Friburgo (imported), Jan. 25–30, 1931	1	
Padua—		
Jan. 18–24, 1931	1	1
Feb. 1–7, 1931	1	1
Feb. 8–14, 1931	1	

UNITED STATES TREASURY DEPARTMENT

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SPECIAL ARTICLES

Epidemic of Ginger Paralysis in Southern California

Report on Survey of Health Progress in Knoxville, Tenn.

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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THE EPIDEMIC OF SO-CALLED GINGER PARALYSIS IN SOUTHERN CALIFORNIA IN 1930-31

By Maurice I. Smith, M. D., *Principal Pharmacologist*, and E. Elvove, Ph. D., *Senior Chemist, National Institute of Health, United States Public Health Service*

Nearly a year after the epidemic of so-called ginger paralysis which afflicted many thousands of persons, especially in the middle and southwestern States, a recurrence of apparently the same condition was reported in Southern California. It will be recalled that the first epidemic, which occurred for the most part during the months of March and April of 1930, was traced to a phenolic ester having the pharmacologic properties of tri-ortho cresyl phosphate (1) (2). This substance appears to have been used in the illicit manufacture of an adulterated fluid extract of ginger for beverage purposes. As soon as the effects of this adulterated ginger became known, the sale and consumption of this preparation practically ceased and the epidemic came to an end.

A few isolated instances continued to occur during the summer and fall months in certain localities. These were found to have been caused apparently by some of the original poisoned Jamaica ginger extract which continued to be retailed in exceptional instances, despite the wide publicity that had been given this matter. An instance of this sort is well illustrated by the experience of Dr. B. T. Burley, of Worcester, Mass., who reported in a personal communication to one of us (M. I. S.) four new cases which came to his attention during the summer and fall months of 1930, the last of these having come to his notice in December. Doctor Burley succeeded in securing some of the ginger extract which was responsible for the last of his cases and pharmacological examination thereof in this laboratory proved conclusively that it contained to the extent of about 2 per cent a substance which behaved in every respect like tri-ortho cresyl phosphate. All the circumstances indicated that this particular ginger extract was probably some of the original material that caused the epidemic during the early months of 1930.

Early in February of 1931 Dr. George Parrish, health officer of the city of Los Angeles, reported to the United States Public Health Service some 45 cases of "ginger paralysis." All these cases, according to Doctor Parrish, occurred in January, and all of them gave a

history of drinking Jamaica ginger extract of a particular brand (Superior) two to three weeks prior to the onset of paralysis. Four dozen 2-ounce bottles of Superior brand Jamaica ginger extract were procured by Doctor Parrish and submitted to this laboratory for examination. Assuming that this material all came from one source, we pooled the contents of about two dozen bottles and subjected it to careful and painstaking chemical and pharmacological examination, but failed to discover anything beyond possible traces of the suspected poison.[1] This finding made it appear for the moment that either some other disease was mistaken for ginger paralysis, or, what seemed more likely, the Superior ginger extract obtained by Doctor Parrish in February was not the same as that which was consumed in December and January by those who fell victims of the disease. The latter alternative seemed very probable, in view of our ample previous experience to the effect that the label of a given brand of such substandard ginger extract meant very little or nothing as to the contents.

A field investigation was therefore undertaken by one of us (M. I. S.) the latter part of February in order to ascertain the nature of the reported epidemic on the Pacific coast and, if possible, the conditions that led thereto.

Working in close cooperation with the health department of the city of Los Angeles and the county health department of Los Angeles County, the local units of the Federal Food and Drug Administration, and the Bureau of Industrial Alcohol, the following facts were obtained:

Jamaica ginger extract labeled U. S. P. fluid extract ginger has been sold through some of the drug trade in and about Los Angeles for several years. Several brands of such material have been used, obviously for beverage purposes, Superior brand being the most popular. Investigation also disclosed that within recent months the company in Los Angeles bottling the Superior brand made a change in the source of supply of its bulk ginger extract,[2] and that the present epidemic, if due to adulterated ginger, must have been caused by material from the last three or four shipments. The last three known shipments from New York to this distributing company in Los Angeles were made on December 23, December 31, and January 7. These consisted of 3, 2, and 5 barrels, respectively. Most of the barrels of the last shipment were not opened, according to the testimony of a representative of this distributing company, while the contents of the barrels of the first and second of these shipments were bottled and much of it was distributed in the usual manner. As

[1] We subsequently learned, as the evidence adduced below will show, that this material represented several seizures in several drug stores of Los Angeles, and while it all bore the identical label, some, and indeed most of it, contained no cresyl phosphate, while some of it contained about 0.25 and 0.5 per cent respectively. By pooling the contents of many bottles we unwittingly diluted this compound beyond the point of recognition with certainty.

[2] Its source for the last few months has been J. B. of New York.

soon as cases of paralysis became known (about 1st of February), this company recalled all the ginger that it had distributed, replaced it in the original barrels, and, together with the several unopened barrels of the last shipment, sent it all back on February 6, to the original consignor. Thus 8 of the original 10 barrels comprising the last 3 shipments were returned,[3] and it would thus seem that only a relatively small amount of the poisoned ginger actually reached the consumer.

AN EPIDEMIOLOGICAL SURVEY IN LOS ANGELES AND ITS ENVIRONS

The data secured by Dr. G. M. Stevens, of the city health department of Los Angeles, showed that by February 20 there were about 80 cases affected in that city. Most of these cases were under observation in the County General Hospital at the time of this investigation. All the patients, with no known exception, freely admitted drinking Jamaica ginger extract, and in most cases it was Superior brand sold in local drug stores.[4] The dates of drinking the suspected material were variously given as from December 25, to about February 15, but usually during the first half of January. The great majority of these patients developed paralysis during the latter part of January and early in February, and there have apparently been no new cases since February 20.

An extremely interesting and important epidemiological focus was uncovered in Whittier, Calif., by Dr. F. G. Crandall, of the county health department of Los Angeles. Whittier has a population of about 15,000 and some 10 drug stores. Only one of these, according to Doctor Crandall's investigation, retailed Superior brand Jamaica ginger extract. Thirteen cases of ginger paralysis, 10 males and 3 females, ranging in age from 26 to 60, occurred in this community. The dates of drinking the suspected ginger, as nearly as it could be ascertained, were between January 18 and January 25, and the onset of paralysis ranged from January 25 to February 5. Personal examination of several of these patients left no doubt as to the correctness of the diagnosis. Only one of these cases stubbornly denied drinking ginger, but finally admitted it on close questioning. Every one of these patients referred to the same pharmacy (G) where this material was dispensed. Close questioning of the proprietor revealed that he had been buying Superior ginger extract from the distributing concern in Los Angeles at the rate of a gross of bottles every 5 to 10 days and that his last purchase had been made on January 17. About 40 bottles of this lot had been sold, which apparently gave rise to the 13 cases of paralysis. The remainder of this lot was care-

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[3] These in turn were seized in Chicago on Feb. 16, by the Food and Drug Administration.

[4] In a few instances it was Superb brand, bottled by a smaller competitor, who, it was subsequently learned, obtained his bulk supply of ginger extract from the same source.

fully destroyed as soon as the occurrence of paralysis in and about Los Angeles became known. An attempt to trace this purchase of January 17 to the original barrel from which this material was bottled failed to yield definite information, despite the apparent willingness on the part of the owners of this distributing company to cooperate in this matter; but it seems likely that it was derived either from the second or, more probably, from the first of the last three shipments of ginger received by this company from J. B. of New York. It thus appears that perhaps the best piece of evidence obtainable, concerning the etiologic relationship of this outbreak to ginger containing cresyl phosphate, was destroyed.

An investigation at Sawtelle, Calif., disclosed that there were over 20 cases at the National Military Home and several cases among the civilian population. The history in these cases was very similar to that of the cases in Los Angeles and Whittier. They occurred at about the same time as those in Los Angeles and Whittier. It was not possible to ascertain definitely in each individual instance where the ginger extract had been procured, beyond the fact that it had been obtained in Los Angeles, San Pedro, or Sawtelle. Two of the Sawtelle pharmacies that were known to retail the ginger product were visited with Capt. L. L. Curtis, chief of the detective bureau. One of these (B, Sample 1 of Table 1) assured the writer that the material he had sold resulted in several cases of paralysis. This lot had been purchased from the concern distributing the Superior brand on January 16. The other (D, Sample 2, Table 1) denied any knowledge of his product being responsible for paralysis, and his last lot, which was freely being dispensed at the time of this investigation had been purchased from the same source on January 31. Samples were secured from both places.

Investigation in other sections of the county indicated that neither had there been any cases of paralysis nor was ginger extract known to have been sold for beverage purposes.

CHEMICAL AND PHARMACOLOGICAL STUDIES

We have examined eight different samples of the suspected ginger extract obtained in those sections where paralysis occurred. Two of these were obtained from retail pharmacies in Sawtelle, as stated above, three in San Pedro, two were sent to us by Surgeon J. A. Mattison, of the National Military Home at Sawtelle, and one was from several dozen bottles sent to us by Dr. George Parrish, city health officer of Los Angeles. As stated earlier in the paper, most of the latter had been pooled, but a sufficient number of these bottles

remained in their original form to enable us to go back and analyze their contents individually. Seven of our eight samples were Superior brand and one was Superb; but, as pointed out previously, the distributors of both Superior and Superb brands obtained their ginger extract from the same source.

These samples were all tested for phenols by means of the Millon reagent, using the same procedure which we employed in our previous work (1). In addition to this qualitative test, quantitative determinations of P_2O_5 were made.[5] The latter was carried out as follows:

Ten c. c. of the sample were measured into an 800-c. c. Kjeldahl flask and the alcohol was evaporated off by placing the flask horizontally into a boiling water-bath so arranged as to heat also the neck of the flask. The evaporation was continued to a semi-solid residue. Five c. c. of diluted (1:1) nitric acid were added and heated carefully over a small flame until the volume was reduced to about 2 c. c. The residue in the flask was then treated with about 7 grams of potassium sulphate and 15 c. c. of concentrated H_2SO_4 and digested, as in the Kjeldahl nitrogen determination, for about three hours. The separation by means of ammonium molybdate as described in the Methods of Analysis of the Association of Official Agricultural Chemists (1925) was then applied and the P_2O_5 was finally weighed as $Mg_2P_2O_7$.

The results of these tests on seven of the samples of partially known history are summarized in Table 1. It will be seen at once that these samples divide themselves into the following three classes:

(1) The samples which gave a positive Millon test and showed P_2O_5 corresponding, in round numbers, to about one-half of 1 per cent tri-cresyl phosphate;

(2) Those which gave a positive Millon test but showed a quantity of P_2O_5 corresponding to only about one-fourth of 1 per cent of tri-cresyl phosphate;

(3) Those which showed up negatively in both the Millon and P_2O_5 tests.

Similar tests conducted upon 10 Superior brand bottles picked up at random by Dr. George Parrish in several retail pharmacies in the downtown section of Los Angeles gave similar results. Class 1 was represented in this instance by only one bottle. The P_2O_5 determinations indicated further that four of these bottles belonged to class 2 and the remaining five to class 3.

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[5] We wish to thank Asst. Chemist C. G. Remsburg, of this laboratory, for assistance in carrying out the P_2O_5 determinations.

Table 1.—*Chemical examination of seven samples of suspected ginger extract from the epidemic area of the County of Los Angeles*

No.	Pharmacy	Locality	Brand	Date of purchase	Millon test	P_2O_5 mg. per 100 c. c.[1]	Tri-cresyl-phosphate calculated from the P_2O_5 values[2]
							Per cent
1	B	Sawtelle	Superior	Jan. 16, 1931	Positive	102.3	0.51
2	D	do	do	Jan. 31, 1931	do	51.6	.26
3	P	San Pedro	do	Jan. 26, 1931	do	51.9	.26
4	F	do	Superb	Jan. 27, 1931	do	55.1	.27
5	H	do	Superior	Jan. 6, 1931	do	103.9	.52
6	B	Sawtelle	do	([3])	Negative	Negative.	None.
7	W	do	do	([3])	do	Negative.	None.

[1] Corrected for traces of P_2O_5 found in unadulterated U. S. P. fluid extract of ginger which averaged 5.5 mg. per 100 c. c.
[2] Figures obtained by multiplying the corresponding P_2O_5 values by 5. The theoretical factor is 5.184.
[3] Submitted by Surg. J. A. Mattison of the National Military Home at Sawtelle. History unknown.

It may be pointed out here that the two samples "B" and "H" of class 1 and sample "G" of Whittier which we did not examine but which almost certainly caused 13 cases of paralysis, had been purchased from the distributing company at Los Angeles within the period January 6–17, while the three samples of class 2, "D", "P", and "F" were purchased subsequent to January 26. We know nothing of the history of the negative samples of class 3. It would seem, therefore, that class 1 is traceable to the New York shipment of December 23, class 2 to that of December 31, or possibly to that of January 7, and class 3 to the last shipment or possibly to shipments preceding the three just mentioned.[6]

It may be recalled here that the sample of ginger of the first epidemic early in 1930, upon which most of our work was done, contained approximately 2 per cent of the cresyl phosphate. It is obvious, therefore, that if the present ginger has any relation to that of last year, which seems very probable, there has recently been considerable dilution of the cresyl compound.

These chemical findings were confirmed pharmacologically, and this we believe is essential; for, as demonstrated elsewhere, the specific action on the neuro-muscular apparatus is characteristic, so far as is known at present, only of the phosphoric ester of ortho cresol and not of the chemically closely related isomers (2) (3). The pharmacologic tests were carried out upon five of the seven samples listed in Table 1, and these fully confirmed the chemical findings.

[6] Since this was written, samples were secured from the eight barrels that were returned by the Los Angeles distributor to the consignor in New York and seized by the Food and Drug Administration in Chicago on February 16, 1931. Chemical analysis for P_2O_5 of these samples showed that they all contained tri-cresyl phosphate, six in the neighborhood of 0.25 per cent and two about 0.5 per cent. The negative samples, therefore, must have belonged to ginger shipped to California prior to December 23, 1930.

The best procedure for carrying out the pharmacologic test, as far as it appears to us at present, is to isolate the ether-soluble fraction from the suspected ginger, purify it by extraction first with acidified water and then with aqueous alkali as herein described, and finally to administer this purified ether-free product to either rabbits or chickens or preferably both, in adequate doses. The latter may be calculated on the basis of the P_2O_5 content of the original ginger extract, or preferably of the isolated fraction. The rabbit presents the advantage of showing the characteristic effects of this ester within 24 to 48 hours. A confirmatory experiment upon the chicken is desirable if not essential; for this animal reproduces fairly accurately the disease as it occurs in man (2). This material is best given to the rabbit by stomach tube in alcohol, preferably not to exceed 6 c. c. per kilo.[7] To the chickens it may be given by crop undiluted in gelatin capsules. By way of illustration, the following example will serve:

Three hundred c. c. of sample No. 1 were evaporated on the water bath under a blast from the electric fan to remove the alcohol. The semisolid residue was transferred quantitatively into a separatory funnel with the aid of about 200 c. c. of distilled water acidified with H_2SO_4 and about 100 c. c. of ether. The acid-extracted ether was then shaken in the separatory funnel with about 25 c. c. of 20 per cent aqueous solution of NaOH. Dilution of this with about 100 to 150 c. c. of H_2O and further shaking removes much extraneous material and leaves a nearly colorless ether solution containing the tri cresyl phosphate. This process may be repeated if necessary. The nearly colorless ether solution was washed two or three times with H_2O to remove the excess alkali and the ether evaporated on the water bath. The ether-free residue measured 10 c. c., or about 3.3 c. c. per 100 c. c. of ginger.[8] That such treatment removes the tri-cresyl phosphate almost quantitatively is shown by an analysis of this material for P_2O_5, which gave a value of 97.0 mg. per 100 c. c. of the ginger extract, as compared with 102.3 mg. found by direct analysis of the original sample (see Table 1).

A similar ether-soluble fraction measuring 10 c. c. was isolated from 300 c. c. of sample No. 4 (Table 1). The P_2O_5 determination showed a recovery of the ester corresponding to 51.2 mg. P_2O_5 per 100 c. c. of the ginger used. Direct analysis of the ginger extract gave a value of 55.1 mg. P_2O_5 per 100 c. c.

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[7] The minimum lethal dose of alcohol in the rabbit is about 10 c. c. per kilo.

[8] U. S. P. fluid extract of ginger treated similarly yields an ether-soluble fraction of approximately 1 per cent.

Table 2.—*Pharmacologic effects produced by ether-soluble fractions derived from each of five samples of suspected ginger extract obtained in and about Los Angeles*

[The samples are numbered in the same order as in Table 1]

No.	Tri-cresyl phosphate, mg. per 100 c. c.	Yield of ether-soluble fraction c. c. per 100 c.c. ginger	Subject	Weight, kilos	Dose of ether fraction, c. c. per kilo	Mg. tri-cresyl phosphate per kilo calculated on basis of P_2O_5	Results
1	511.5	3.3	Rabbit	2.0	1.0	150	Moderately severe symptoms 3 days. Dose repeated. Severe symptoms 2 days. Died.
			Hen	2.8	1.5	225	Complete paralysis of extremities after an interval of 12 days.
2	258.0	3.8	Rabbit	1.7	2.0	136	Characteristic moderately severe symptoms for 16 days. Progress unchanged.
			Hen	1.9	1.8	122	Ataxia and distinct leg lameness after 12 days. Complete leg paralysis after 15 days.
3	259.5	2.8	Rabbit	1.8	2.0	184	Moderate to severe symptoms for 4 days. Died.
			Hen	1.9	1.8	165	Ataxia and leg lameness after 15 days.
4	275.5	3.3	Rabbit	1.6	2.0	166	Moderately severe symptoms for 18 days. Died.
			Hen	2.2	2.0	166	Ataxia and leg lameness after 14 days.
5	519.5	3.2	Rabbit	1.8	1.0	162	Moderate to severe symptoms for 4 days. Died.
			Hen	1.5	1.0	162	Ataxia and leg lameness after 16 days.

The pharmacologic effects following the administration of such ether-soluble fractions isolated from each of the five samples of suspected ginger extract giving positive Millon and P_2O_5 tests are shown in Table 2. We have previously shown that the minimum lethal dose of the chemically pure tri-ortho cresyl phosphate in the rabbit is about 100 mg. per kilo (2). The characteristic toxic or lethal effect produced in rabbits by the administration of the ether-soluble fractions in doses of about 130 to 180 mg. of the cresyl phosphate reckoned on the basis of P_2O_5 of the corresponding gingers is considered to be fully in agreement with the chemical findings. The surely paralyzing dose of the pure ester in chickens we found to be about 200 mg. per kilo, though as little as 50 mg. or less may produce distinct leg lameness and ataxia (2). The present results in chickens with the ether-soluble fractions given in doses equivalent to 120 to 225 mg. of the ester per kilo must be considered as conclusive proof of the occurrence of the specific paralyzing ortho cresyl phosphoric ester in some of the adulterated ginger extract distributed recently in Los Angeles and surrounding territory. Since the highest concentration of the specific ester found was not over 0.5 per cent, or only about one-fourth that found last year, the susceptibility of man to this unique poison is of considerably higher order than was hitherto suspected, provided of course that the testimony of some of the recent victims that not more than one 2-ounce bottle was drunk, may be accepted. It seems also certain that probably many cases escaped injury on account of the high dilution of the toxic ingredient.

SUMMARY

A survey was made of the epidemic of ginger paralysis which occurred in southern California during the latter part of 1930 and the early part of 1931.

The investigation showed that in the latter part of December of 1930 or early in January of 1931 adulterated fluid extract of ginger containing tri-cresyl phosphate was shipped from New York to Los Angeles, and thence distributed through the retail drug trade in Los Angeles, San Pedro, Whittier, Sawtelle, and possibly other near-by sections. The consumption of this beverage resulted in an epidemic of "ginger paralysis" comprising about 125 cases. The epidemic occurred for the most part during the last two weeks of January and the first two weeks of February.

Due to the early recognition of this condition and the effective measures taken by the local city and county health departments to prevent the further distribution of this ginger extract, the epidemic was quickly brought under control.

It is our belief that unless effective measures are instituted to stop completely the manufacture, distribution, and sale of all misbranded fluid extract of ginger for beverage purposes similar recurrences may be expected in the future in sections where "ginger paralysis" has not been known heretofore.

Further details are given of the comparatively simple technique whereby such adulterated fluid extracts of ginger may be tested, both chemically and pharmacologically.

ACKNOWLEDGMENTS

It is a pleasure to acknowledge the help and cooperation of the health departments of the city and county of Los Angeles. We are especially grateful to Dr. J. L. Pomeroy and his staff for the many courtesies and laboratory facilities; and to Dr. Geo. Parrish and members of his staff for much valuable information that led to securing samples of ginger extract containing tri-cresyl phosphate. Our thanks are also due to Mr. B. C. Winslow, of the Food and Drug Administration at Los Angeles, for much helpful information.

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PUBLIC HEALTH PROGRESS IN KNOXVILLE, TENN.

By JOSEPH W. MOUNTIN, *Surgeon, United States Public Health Service*

(The introduction and Part I, Prevention of Illness and Promotion of Health, were published in the preceding issue of PUBLIC HEALTH REPORTS.)

PART II. CARE OF THE SICK

Even under the most satisfactory type of preventive program illness will occur. Certain diseases can not be prevented, accidents to a certain extent are unavoidable, and because of the normal wear and tear on the body there will be disturbance of function. The great majority of persons obtain medical service through private physicians, dentists, nurses, and hospitals. In all communities, however, a certain percentage of the people, at one time or another, must obtain medical care by using the facilities provided through private charity or the public revenue. In Knoxville the city provides practically all medical service to the sick poor except that which may be given by private physicians and dentists on their own initiative. Certain charity and welfare organizations may defray the cost of service to their clientele, but in doing so they utilize existing public or private facilities. No attempt was made to estimate the medical service rendered by private physicians and dentists or underwritten by welfare organizations, and only such studies were made of private hospitals as might help to complete the picture of community service.

The public facilities of a major character for caring for the sick poor of Knoxville are as follows:

Knoxville General Hospital.
Knoxville General Hospital (contagious-disease unit).
Beverly Hills Sanatorium.
Knoxville General Hospital (out-patient department).
Bureau of health venereal-disease clinic.
Bureau of health tuberculosis clinic.
City physicians.
Bureau of health nursing service.

KNOXVILLE GENERAL HOSPITAL

The Knoxville General Hospital is owned and operated by the city of Knoxville. It is in charge of a resident superintendent, who is appointed by the city manager and is directly accountable to the director of public welfare. The resident medical staff consists of one resident in medicine, one resident in surgery, seven medical internes, and one dental interne. Practicing physicians of the city, drawn from the various specialties, are placed on the visiting staff by the director of welfare. An executive committee represents the visiting staff in matters of a professional or administrative character. Staff meetings are held once each month. Special teaching clinics, open to visiting physicians, are held throughout the day on Friday of each week.

The general hospital proper was built many years ago, and is therefore out of date in its design and construction. The building is not fireproof. The contagious-disease unit, however, is thoroughly modern in all its features. The hospital operates a training school for nurses and an out-patient department, both of which are charged to the general hospital operating costs. The hospital is approved by the American College of Surgeons and by the American Medical Association for the training of internes.

Number and classification of beds

Working capacity	212
Maximum capacity	250
Pediatrics	10
Obstetrics (white)	19
Obstetrics (colored)	4
Bassinets (white)	14
Contagion	36
Open	143

Utilization of hospital

Total hospital patients	4, 576
X ray only (not admitted to hospital)	371
Emergency (not admitted to hospital)	1, 664
Free patients	2, 656
Pay patients	1, 921
Available hospital days (working capacity)	77, 380
Percentage utilization	68. 9
Free hospital days	35, 495
Pay hospital days	18, 896
Total hospital days	54, 391

Receipts and expenditures

Total expenditures	$225, 605. 00
Receipts from pay patients	94, 091. 75
Net expenditures from public revenue	131, 513. 25

NOTE.—Above expenditures include operation of out-patient department and nurses training school.

Cost per patient per day	$4. 18
Average daily attendance (free)	97. 25
Average daily attendance (pay)	51. 75
Average days of residence, free patients	11
Average days of residence, free and part-pay	10. 45

Bed charge per day for full-pay patients

Ward	$2. 30
Rooms	$3. 50 to $5. 00

(The exact number of pay and free beds is not specified. The above cost includes professional services unless patient has private physician.)

Eligibility requirements.—Free patients must have resided in the city six months, and their income must be below the following scale: Single person, $50 per month; family of two, $75; family of four, $100; and in no instance can the family income be above $120 per month. Financial eligibility may be determined by social service, or

by the hospital superintendent. Medical eligibility may be determined by the hospital superintendent, the out-patient department, or the city physicians. There are no established eligibility standards for pay and part-pay patients. The superintendent of the hospital, in conjunction with the social service department, determines whether the patient shall pay and the amount the patient shall pay. Emergency cases are accepted but may later be sent elsewhere if not eligible for regular care.

The hospital has no special facilities for convalescent care. A limited number of persons, especially the aged and infirm, are sent to the county alms house; others must remain in the hospital or be discharged without provision for convalescent care, other than that which may be furnished at the out-patient department or by the city physicians.

There are no satisfactory provisions for psychiatric care. Violent patients are placed in cells pending their transfer to the State hospital at Lyons View. It is reported that approximately 50 insane patients are cared for at the county alms house.

A contagious disease unit of 36 beds capacity was opened in December, 1928. The building is thoroughly modern in design, construction, and equipment. It adjoins the general hospital, and is operated as part of the hospital proper.

OUT-PATIENT DEPARTMENT

The out-patient department is located in the basement of the annex to the nurses' home. It has been in operation for the past six years. The quarters are not desirable, but the equipment is fairly good. The superintendent of the General Hospital has charge of the out-patient department, but active management is delegated very largely to the chief nurse of the out-patient department. The medical staff is consolidated with the staff of the General Hospital, and the visiting members serve without compensation. The established standards of eligibility are the same as those for admission to the hospital proper, but there is not the same flexibility in their application. The determination of eligibility is a function of social service. One social worker serves the out-patient department and the hospital proper. Most of her time is spent in determining the eligibility of patients, and to a great extent she is forced to call on other agencies for such medical social service case work as may be performed. At the present time no charge is made for visits to the clinic, but a plan is now being considered providing for a nominal charge for clinic service. Patients are now reclassified with regard to eligibility every three months. About 16,000 persons constitute the clientele of the clinic and apply for some part of their medical service. Patients needing home nursing care are referred to the nursing service of the city bureau of health.

Utilization

Total patients admitted	3, 048
Total visits	13, 927

Classification of visits

Eye, ear, nose, and throat	2, 816
Genito-urinary	271
Gynecology	859
Medical	3, 530
Prenatal	948
Orthopedics	163
Pediatrics	588
Surgical	2, 557
Dental	1, 228
Proctology	96
Neurology	17
Skin	563
Miscellaneous	291

Venereal disease clinic

See Part I, "Prevention of Illness and Promotion of Health," "Venereal Disease Control."

Tuberculosis clinic

See Part I, "Prevention of Illness and Promotion of Health," "Tuberculosis Control."

CITY PHYSICIANS

These physicians are employed to care for indigent, bed-ridden patients in their homes, to treat patients in the city jail, and to determine medical eligibility for admission to the General Hospital. They are under the charge of the director of public welfare and are directly accountable to him.

Prior to the beginning of the present fiscal year the city employed one full-time white physician and one part-time colored physician. The office was in the General Hospital out-patient department. They made approximately 9,000 calls per annum. Since the beginning of the present fiscal year the number of employees has been as follows:

Physicians for general duty (white)[1]	3
Physicians for general duty (colored)	1
Physicians for tuberculosis	1
Secretary	1

Each general duty white physician is paid $250 per month, the colored physician $150 per month, and the tuberculosis physician is paid $100 per month. The white general duty physicians care for the general run of illness in a given district, but the colored general duty physician cares for cases of all types occurring among the colored people. A physician cares for white bedfast tuberculosis patients. Records for the present fiscal year were not complete or in readily available form. Visits for the months given below were as follows:

[1] One position vacant.

Month	White	Colored	Total	Month	White	Colored	Total
February	460	255	715	May	260	227	487
March	349	323	672	June	277	218	495
April	310	309	619	July	116	191	307

An account of the tuberculosis work for the full period was not obtained. In May 8 cases were seen and 25 visits were made. In July 3 cases were seen and 16 visits were made. The number of patients seen by all physicians was not tabulated. It is estimated that from two to three visits are made on each patient. The great majority of patients seen are referred to the out-patient department of the General Hospital, to the General Hospital proper, or to Beverly Hills Sanatorium, depending upon the nature of the illness.

HOME NURSING SERVICE

Bedside nursing care on a home visit basis is given by the nurses of the bureau of health as a part of the generalized nursing program. This service is discussed in the section "Public Health Nursing" of Part I.

BEVERLY HILLS SANATORIUM

The Beverly Hills Sanatorium is for the care of tuberculous patients from Knoxville and Knox County. It is located in the county a few miles beyond the city limits. The grounds were acquired and the buildings were erected through private donations sponsored very largely by the Civitan Club of Knoxville. The board of managers is composed of one member selected by the county court, one member selected by the city council, and three citizens selected by the Civitan Club of Knoxville. A resident medical superintendent is in immediate charge.

Capacity and utilization

	Number
Bed capacity [1]	161
Normal operating capacity	150
Extreme capacity	175
Average census (1929)	133

Approximate classification of beds

White adult male	44
White adult female	67
White children	25
Colored adults and children	25
Total	161

Waiting list, none.

Usual period of residence, 6 to 8 months.

[1] Present budget permits operation of 150 beds at $1.91 per day.

Classification of patients

	Number
Adults	161
Children under 12 years	28
Total	189

	Per cent
Incipient	20
Moderately advanced	30
Far advanced	50

Operating cost (present budget)

Knoxville	$45, 000
Knox County	45, 000
Knoxville Community Chest	8, 582
Total	98, 582

Per patient-day cost, $1.91.

Standards for admission.—Persons must be bona fide residents of the city or county for a period of not less than six months preceding admission. Both white and colored persons are admitted without regard to economic circumstances. Patients able to pay are expected to do so. The amount is left to the judgment of the superintendent and subject to the approval of the operating board. Approximately 5 per cent are either part or full-pay patients.

The medical staff of the sanatorium conducts the field clinics for both Knoxville and Knox County and all patients are now admitted through these clinics. The plan now in operation provides for selection of those patients for sanatorium care who present some chance for arrest of the disease, those of extremely poor economic circumstances, and cases where the hazard of keeping the patient at home is very great. Patients are discharged to the field clinics, where they report regularly for continuing observation.

PRIVATE GENERAL HOSPITALS

Number and cost of beds

Hospital	Total beds	Cost per bed day								
		Free	$3	$3 50	$4	$4.50	$5	$6	$7	$8
Riverside Ft. Sanders	122		27		4		30	40	24	
St. Marys	50		8	3		12	5	10	8	8
Howard-Henderson	40						15	(25 beds $6 to $8).		
Lemon (colored)	6		6							
Green (colored)	6		6							

Riverside–Fort Sanders has 122 beds in regular operation; capacity can be expanded to 170 beds. The occupancy rate is 72 per cent of capacity figured on the basis of 122 beds

St. Marys is a new hospital which was in operation for only part of year.

Howard-Henderson, Lemon, and Green are proprietary hospitals operated by physician owners.

SPECIAL HOSPITALS

There are also two privately owned and operated eye, ear, nose, and throat infirmaries and a trachoma hospital which is operated by the United States Public Health Service. The trachoma hospital serves Tennessee and adjoining States, but the majority of the patients are residents of Tennessee. The Eastern State Hospital for mental diseases is located at Lyons View, just beyond the city limits of Knoxville.

COMMENTS

The Knoxville General Hospital, with the exception of the contagious disease unit, is a very old structure and no longer suited for hospital purposes. It is a definite fire hazard and should be replaced by a modern building. While the internal management of the hospital was not studied, the impression was obtained that very good work is being done in spite of the handicap in physical plant. The standards of income governing eligibility for free treatment seem rather rigid, but so long as the superintendent is given broad discretionary powers no hardship may be imposed on the patients. While the proportion of pay patients seems high, the amount of money received is quite small, since many patients pay but a small part of the cost.

The social-service organization is wholly inadequate, especially in view of the fact that there are no facilities for convalescent care. So far as could be determined, the major concern of social service is the determination of eligibility for treatment and very little or no attention is being given to medical social service case work. The hospital is forced to care for a large number of persons who are not bona fide residents of the city. To a certain extent the problem might be solved through a unification of city and county medical services, but in its larger aspects the problem can be met only by some plan of State aid on nonresident charity patients. Within the hospital proper, some provision should be made for the temporary care of psychopathic patients. Convalescent and chronic patients could be cared for much more effectively and economically in a convalescent home. Many such cases now are forced to remain in the hospital for several months.

The number of hospital beds for general use (including public and private hospitals) is rather low, being 3.7 per 1,000 population. Figures on utilization were obtained for about two thirds of the beds; on these the utilization averaged about 70 per cent. Even these figures are misleading, since the three larger hospitals could increase the bed capacity of the present facilities. In spite of the small number of beds in proportion to the population, the city seems to be well

supplied when the utilization of existing facilities is the criterion for judging adequacy. The cost of bed care in both the city and private hospitals seems to be reasonable, particularly in view of the fact that beds are not endowed.

The contagious disease unit of the General Hospital is thoroughly modern in all of its features. It is not, however, sufficiently integrated with the field control work of the bureau of health to fill the rôle it should occupy in the community program of prevention and control. Many of these defects might be corrected by placing either the city health officer or the epidemiologist on the staff.

The General Hospital out-patient department is housed in very poor quarters. The equipment, however, is adequate for the general run of dispensary cases. The rigid observance of low economic standards of eligibility for free treatment to a certain extent must lessen the usefulness of the clinic, but even with this limitation the facilities of the clinic are taxed at times. A plan is now being considered under which a small charge will be made for each visit and for the more expensive treatments. Such a plan is in vogue in many places. If the clinic is put on a pay basis the revenue should be used to increase the scope and quality of the service, since a clinic established for the sick poor should not be used by the city as a source of general revenue.

The tuberculosis clinics and the venereal disease clinics are discussed under the headings "Tuberculosis Control" and "Venereal Disease Control" in Part I, "Prevention of Illness and Promotion of Health."

The Beverly Hills Sanatorium is very well adapted to its purpose. It is ample in its provisions, there being more than one bed for each tuberculosis death occurring in the city and county. At the present time the proportion of advanced cases is high, and the percentage of patients from the city is high in relation to those from the county. These two defects are being corrected. The institution appears to be well managed and doing an excellent piece of work.

Experience has demonstrated that there is a limited need for physicians to care for the sick poor in homes. The great majority of patients, however, can be cared for more effectively and economically in some other manner. The type of home where such patients live is not a suitable place to care for the acutely sick; they should be hospitalized. The ambulatory patients should go to the out-patient clinics. Most convalescent and chronically sick persons are primarily in need of nursing care, with only an occasional visit by a physician. The number of city physicians, particularly white physicians, seems out of proportion to the requirements. The need for the special physician for chronic tuberculous patients is not understood. The whole service does not appear to be integrated with other elements of the program of prevention and treatment.

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PART III. SELECTED WELFARE ACTIVITIES

The general field of welfare was not covered by the survey. Health and general welfare are quite closely related, and in some phases of the community organization the success of certain activities in one field depends to a great extent on the proper performance of a complementary activity in another field. The general scheme of organization is presented in order that the reader may gain a more comprehensive picture of community health problems and resources.

Specific recommendations regarding individual activities are not made, first, because sufficient data was not gathered on which to base such recommendations, and, second, because a special survey of welfare organization and needs is contemplated.

CITY DEPARTMENT OF PUBLIC WELFARE

The department of public welfare is one of the five departments of the city government. It is under the charge of the director of public welfare, who is appointed by and is accountable to the city manager. The department is composed of the following bureaus of services, each under the charge of a chief:

Bureau of health.
Knoxville General Hospital.
Beverly Hills Sanatorium (city and county.)
City physicians.
Camp Home for Friendless Women.
Bureau of Recreation.
Juvenile court.
Bureau of employment.
Bureau of smoke regulation.
Municipal airport.

Budget of the Department of Welfare (1930)

Administration	$7, 173. 00
Bureau of health	74, 107. 00
Knoxville General Hospital [1]	225, 605. 00
Beverly Hills Sanatorium	45, 000. 00
City physicians	15, 250. 00
Camp Home for Friendless Women	5, 950. 00
Bureau of recreation	17, 538. 00
Juvenile court	5, 268. 43
Detention home	6, 574. 00
Bureau of employment	1, 200. 00
Bureau of smoke regulation	5, 442. 00
Municipal air port (proposed)	2, 228. 00
Baby home	7, 000. 00
Associated charities	11, 329. 00
Golf course [2]	19, 626. 00
Total	449, 290. 43

[1] About $94,091.75 of hospital operating costs defrayed by pay patients.
[2] Golf course very nearly self-sustaining.

The bureau of health, the Knoxville General Hospital, and the Beverly Hills Sanatorium have been considered in other sections of the report.

CAMP HOME FOR FRIENDLESS WOMEN

Camp Home was established through a bequest by Mr. Camp. The original purpose of the home is not clear. It was patronized, however, very largely by prostitutes who failed to set aside a competency and who no longer were able to support themselves. With the beginning of venereal disease control work, following the World War, the management of the home was taken over by the city and its purpose was changed to the detention of venereally infected prostitutes. During the last few years the home has also been used as a jail for the detention of other female prisoners.

The present building is located near the jobbing and wholesale district. It is of brick construction and was formerly a residence. About 25 inmates can be accommodated, but owing to budget limitations the number has been reduced to six, all of whom were referred by the bureau of health venereal disease clinic. The personnel consists of one matron, one assistant matron, two cooks, and one janitor. A nurse from the bureau of health venereal disease clinic gives local treatments. Those requiring other forms of treatment are taken to the bureau of health venereal disease clinic by the police. The amount set aside in the budget for the operation of the home is $5,950.

Comments.—The local health authorities believe that Camp Home is worth the present expenditure in compelling clinic attendance, since women much prefer coming to the clinic over detention at Camp Home. From other points of view, it is very questionable whether the continuation of the home can be justified as a public health measure. No doubt there is need for some better arrangement to care for female prisoners. An industrial home is contemplated. In the planning of such an institution provision should be made for social rehabilitation. Under such arrangements a much more constructive venereal disease program might be conducted than is now possible in Camp Home. Meanwhile, Camp Home might as well be continued as a sort of makeshift jail and for its disciplinary influence in the venereal disease treatment program.

BUREAU OF RECREATION

The bureau of recreation is under the charge of a director who has had training and experience in recreation work. The bureau has charge of parks, playgrounds, and other recreational facilities. The following activities are promoted and supervised.

Athletic games.
Recreation periods in industries.
Picnics, parties and festivals.

Aquatic sports.
Dramatics.
Handicraft.

JUVENILE COURT AND DETENTION HOME

Both the juvenile court and the detention home are under the charge of the juvenile judge, who serves both the city and county. The detention home, however, is supported entirely by the city. Court sessions are conducted in the detention home. The personnel of the 2 institutions consists of the juvenile judge, 1 secretary, 2 white male probation officers, 2 white female probation officers, and 1 colored male probation officer.

The detention home is not suited to its purpose with regard to location, size, or arrangement. No provisions are made for studying the child from the physical or mental standpoint or from the point of view of social background. There is no organized program of social case work. A plan is now under consideration whereby the city and county are to unite on the construction and operation of a new detention home.

NONOFFICIAL PUBLIC WELFARE AGENCIES

COMMUNITY CHEST

The Knoxville community chest is essentially a collection agency. It exercises very little supervision over its member organizations. The following agencies collect all or part of their funds through the community chest:

American Red Cross.
Associated Charities.
Beverly Hills Sanatorium.
Boy Scouts of America.
Children's bureau.
Church Mission of Help.
Home for Friendless Babies.
Knoxville Colored Orphanage.
Knoxville Girl Scouts.
Salvation Army.
Strong Mission Home.
Travelers Aid Society.
Volunteers of America.
Young Men's Christian Association.
Young Women's Christian Association.

FAMILY WELFARE

The Associated Charities is the principal family welfare agency. The personnel consists of 1 executive secretary, 1 office secretary, 4 field workers, and 1 registrar. The total budget is $30,829, of which $19,500 is obtained from the community chest and $11,329 from the city of Knoxville. The program embraces the field of general

family welfare, including the giving of material relief. Transients, particularly men, are cared for by the Salvation Army. A service somewhat similar for women with dependent children is performed by the Volunteers of America.

CHILD CARE

The program of child care is primarily institutional. The following named are the larger institutions:

Home for Friendless Babies.
St. John's Orphanage.
Strong Mission Home.
Knoxville Colored Orphanage.

Within the past few years the children's bureau began the placement of children in foster homes. During the first six months of 1930, 69 applications were filed and 26 were accepted. This agency is the only one doing systematic placement work. It is seriously handicapped by lack of funds.

COMMENTS

A sufficient study was not made of welfare activities to warrant critical judgment or specific recommendations. The impression gained indicates that there is a lack of professional direction and coordination of work such as should pervade the whole program. These defects are even more apparent in the work of private agencies. The program of the organizations for child care, with few exceptions, is essentially institutional in character. Generally speaking, social case work does not receive proper emphasis. It was reported that very few persons engaged in social welfare work have a sufficient background of professional training and experience. A number of the workers and interested persons understand the disorganized state of affairs. There has been some agitation for a survey and study of all welfare activities, but the plan has not materialized. Such a survey is indicated since there are many problems in need of study and adjustment. The public spirit of the citizens of Knoxville is attested to by the variety of its welfare work. The time, however, has arrived when welfare work should be put on a more businesslike basis with each agency playing its part in a larger coordinated program and performing its work in accordance with correct social practice. The proposed survey should therefore embrace the whole field of social welfare and should be conducted from the administrative point of view. It should be done by a person accustomed to making such surveys and who has a background of experience in the management of programs of social welfare.

SUMMARY AND MAJOR RECOMMENDATIONS

PUBLIC HEALTH SERVICE

Summary and comments.—Viewed over a period of years Knoxville has made commendable progress in its public health service.

Since 1923, when the first survey was made, a bureau of health has been organized and has continued under the direction of trained full-time health officers. The annual appropriation to the bureau of health from public funds has increased from $17,404, or approximately 20 cents per capita, to $74,282, or 69 cents per capita, for the fiscal year 1929–30. In addition the board of education spends $12,265, or 1.18 cents per capita, for public health. These funds are supplemented by about $22,000, or 2.13 cents per capita, by nursing fees. A large part of the increase in public expenditure, however, resulted from the transfer of services from private agencies to the bureau of health.

Improvements in the field of sanitation have been most striking. A modern water plant was constructed, and at the present time 96.4 per cent of the dwellings are connected to the public supply. In 1923 there were approximately 10,000 surface privies. The number has been reduced to about 7,000, and these have been reconstructed along sanitary lines. A bond issue of $2,000,000 was passed which will be used for sewer extension work. Under the proposed plan more than 90 per cent of the dwellings will have sewers accessible. Milk is now produced under sanitary conditions, but the percentage of milk being pasteurized is far too low, and much of the pasteurizing machinery is in need of replacement. A thoroughly modern refuse collection and disposal system has been developed through the department of public service. The city has passed a housing and a zoning ordinance, thus assuring buildings of a better type in the future.

Laboratory service has been improved very materially. Formerly it was performed by a technician attached to the private laboratory of the city health officer. A new and thoroughly modern laboratory has been installed in a special building located near the bureau of health.

Communicable disease control practice has been brought up to date under the direction of a trained epidemiologist. A very splendid communicable disease hospital unit is operated in conjunction with the Knoxville General Hospital. As yet the work of the communicable disease hospital has not been properly coordinated with the work of the bureau of health. The striking defect in the communicable disease control program is the small amount of immunization work which is being done against diphtheria and typhoid fever. Venereal disease and tuberculosis control work are well organized, but both services are in need of further development.

Improvements in the fields of hygiene have not been so striking. A large part of the apparent increase in personnel and expenditures of the bureau of health is consumed by services transferred to the bureau of health which formerly were borne by the private agencies. The volume of effective service has not been so markedly increased. Child hygiene is still very much in need of development.

Death rates in the main have shown a very decided downward trend; yet many rates from causes commonly classed as preventable are far too high. Among these may be mentioned deaths from childbirth, typhoid fever, diarrhea and enteritis, tuberculosis, pellagra, and deaths occurring in infancy.

Expenditures for public health,[1] fiscal year 1928–29

Agency	Amount	Per capita	Per cent
Bureau of health	$65,061.73	$0.638	65.4
Board of education	12,265.00	.118	12.3
Metropolitan Life Insurance Co.	22,160.00	.213	22.3
Total	99,486.73	.969	

[1] Bureau of health appropriation current fiscal year 1929-30, $74,282. Funds from other sources about the same as for 1928–29.

Summary of score

Item	Total allowed	Score attained	Per cent
Vital statistics	50	43.5	87.0
Communicable disease control	160	124.0	77.5
Venereal disease control	50	43.5	87.0
Tuberculosis control	90	63.3	70.3
Maternity hygiene	80	57.2	71.5
Infant hygiene	80	47.8	59.8
Preschool hygiene	80	30.2	37.6
School hygiene	120	70.2	58.5
Food and milk control	70	51.2	73.2
Sanitation	80	49.5	61.9
Laboratory	60	56.8	94.7
Popular health instruction	40	20.8	51.0
Cancer control	20	0	0
Heart disease control	20	0	0
Total	1,000	658.0	65.8

It will be seen from the foregoing tables that the total expenditure for public health service is 96.9 cents per capita and that the service receives a score of 658.0 out of a possible 1,000 points. Knoxville is receiving a very good return on its investment in public health, but the expenditure is inadequate. Experience has demonstrated that an expenditure of about $2 per capita is required to defray the cost of a reasonably complete public health service.

In reviewing the score it will be seen that service to the child falls below the general average. Decided losses in score also are sustained because of the small percentage of milk being pasteurized, and because there are so many dwellings not connected to the sewer. Popular health instruction, too, is rather weak. No credit could be given

for control of cancer or heart disease; however, it may be said that such work is rather new and not included in programs of many health departments.

Some very marked improvements have been made in the plan of administration of health services. The work of the bureau of health has been placed under the direction of a full-time trained public health officer who has surrounded himself with an able corps of assistants. Public health work has been put on a professional basis and activities, in the main, are directed toward the accomplishment of definite objectives. Progress has been made in having the city assume functions formerly undertaken by volunteer agencies. In doing so, however, the public health service has lost much in the way of public interest and support. There is a distinct need for a reawakening of interest on the part of the general public but more particularly the leaders of community thought.

Previous surveyors recommended the creation of a board of health, but this recommendation has not been carried out. Under a unified plan of public health administration the constituted public health agency must serve many organizations which have public health problems; in like manner the public health agency must utilize many community resources. It is quite necessary that there be a forum for discussion of problems and relationships. Under the existing plan of government there is no provision for a board of health with legislative and administrative authority. The main purpose of a board could be accomplished by the formation of an advisory public health council, which would also tend to promote a more active interest on the part of the public and organizations directly or indirectly concerned with public health.

Previous surveyors also recommended that school hygiene work be transferred from the board of education to the bureau of health. The board of education agreed to subsidize the salaries of five nurses of the bureau of health, but otherwise there has been no transfer of the school hygiene work. At the beginning of the coming school term this agreement will terminate and all school hygiene work will revert to the school board. The school authorities here, as in many other places, seem to feel that the school child and all his needs should be handled by the board of education. The writer shares the views held by most public health administrators that public health service is a function which should be under the direction of the health officer, and that the health needs of the school child can be met most effectively and economically through a program of general health service applicable according to age and condition to all members of the community. Formal health instruction of the school child and the maintenance of special facilities for the general education of physically and mentally handicapped children are recommended for further development by the board of education.

The public nursing service has been consolidated under the bureau of health and work is performed on the so-called generalized district plan. Within the very near future there will be three distinct nursing services, viz, the bureau of health, the school board, and the Metropolitan Life Insurance Co. ·The nursing program of the bureau of health for the immediate future will be confined to preventive work on communicable diseases, tuberculosis, maternity, infant and preschool hygiene. The field staff of the bureau of health will be reduced to four nurses unless the six additional nurses included in the budget now being considered are allowed by the city council. If this increase is granted there will be one nurse for each 10,500 inhabitants. Experience has demonstrated that there should be 19 nurses for the work contemplated. The number of school nurses (5) more nearly approaches the recognized standard of adequacy.

Knoxville and Knox County, to a great extent, are dependent one on the other for the protection of the public health, particularly with reference to communicable diseases. The city and county should look forward to a unification of their health organization. Meanwhile, however, provision should be made for exchange of information relating to communicable diseases and other health problems; and wherever possible there should be joint use of facilities. An excellent beginning has already been made in the joint use of clinical facilities for tuberculosis and venereal disease control.

Major recommendations.—1. The appropriation to the bureau of health should be increased at once in order to permit the employment of six additional nurses requested in the budget now under consideration. As rapidly as possible the nursing personnel should be further expanded and bedside care of at least selected cases should be included in the program when nursing personnel has been made available.

2. A proper liaison arrangement should be developed between the bureau of health and the practicing physicians whereby the bureau of health nursing service may have a wider field for effective service, particularly in the fields of maternity and child hygiene and tuberculosis.

3. A similar liaison should be developed with the Knoxville General Hospital when and if a program of bedside nursing care is developed by the bureau of health.

4. The school authorities should confine their activities to health education and the maintenance of special teaching facilities for the handicapped. The protection and promotion of the health of the school child should be a function of the bureau of health.

5. The bureau of health should employ a full-time physician trained and experienced in child hygiene work who should have charge of maternity and child hygiene work.

6. Venereal disease control activities, particularly social service and social hygiene work, should be expanded. More desirable clinic quarters should be provided.

7. The work of the communicable disease hospital should be more definitely integrated with the work of the bureau of health.

8. Immunization work, particularly against diphtheria and typhoid fever, should be expanded and the bureau of health must take a more active part since the present plan of having private physicians do the work does not appear to be successful.

9. The city communicable disease ordinance should be brought into conformity with State laws and regulations of the State department of health.

10. A more consistent effort should be made to bring about universal pasteurization of milk.

11. A public health council should be formed on which would be represented the various organizations and interests concerned either directly or indirectly with public health work.

CARE OF THE SICK

SUMMARY

Private provisions.—In Knoxville the great bulk of medical service is rendered by physicians and dentists in their private capacity. Patients may be treated in the office, in the home, or in a hospital. No attempt was made to study the whole field of private medical service rendered by physicians, dentists, and nurses. There are two privately operated public hospitals having a total regular operating capacity of 172 beds. Fifty-two beds are available in three proprietary hospitals, thus making a total of 224 beds available for general service. In addition, there are two proprietary infirmaries for the care of eye, ear, nose, and throat conditions. Of the 224 beds available for general service, 47 rent for $3 per day, 69 for between $3.50 and $5, and the cost of the remaining beds varies from $6 to $8 per day. The facilities for private care available in the Knoxville General Hospital are included in the following section "Public provisions."

Public provisions.—Provisions for the care of the sick poor at public expense are made available through the following institutions and agencies:

The Knoxville General Hospital accepts general medical and surgical patients including children, obstetrical patients, and patients with contagious diseases. The working capacity of the hospital is 212 beds, but this number may be increased to 250 beds. About two-thirds of the hospital days are free and one-third are for pay. Sixty-one per cent of the cost of maintenance is defrayed by taxes and the remainder is collected from patients.

Beverly Hills Sanatorium is maintained solely for the care of tuberculosis. The normal bed capacity is 150, but this number may be increased to 161. The institution is supported jointly by Knoxville and Knox County.

The Knoxville General Hospital out-patient department is maintained by the city for the treatment of the ambulatory sick. The service embraces the usual medical and surgical clinics and most of the allied specialties. A total of 3,048 patients made 13,927 visits to these clinics during the year.

Venereal disease and tuberculosis clinics: These clinics are operated by the bureau of health. During the year, 1,806 patients made 31,467 visits to the venereal disease clinic and 1,329 patients made 1,418 visits to the tuberculosis clinic. These clinics are considered in Part I, "Prevention of Disease and Promotion of Health."

City physicians: There are five city physicians who are employed to determine medical eligibility for admission to the General Hospital and to give home care to patients not able to attend the clinics. These physicians average about 530 calls per month.

Home nursing care: This service is performed by the bureau of health nurses, but for the most part it is done on a fee basis and for beneficiaries of the Metropolitan Life Insurance Co.

COMMENTS

The major expenditures from city funds for the care of the sick are as follows:

Knoxville General Hospital	$136, 581. 65
Beverly Hills Sanatorium	45, 000. 00
City physicians	15, 000. 00
Total	196, 581. 65

This expenditure, which amounts to $1.85 per capita, is well above the expenditure for prevention, but both expenditures are rather low. Generally speaking, however, Knoxville has made many improvements in facilities for the care of the sick poor. The communicable disease unit is a valuable addition to the General Hospital. The erection of a unit for colored patients, in part to be financed by the Julius Rosenwald Fund, is now being considered. The General Hospital proper, however, is out of date and should be replaced by a modern fireproof building. Beverly Hills Sanatorium is admirably suited for the care of tuberculosis patients and the present facilities should meet the needs of Knoxville and Knox County for some time. The general clinics for ambulatory patients, while still in a developmental state, promise to fill a very definite need. Practically all the clinics are definitely handicapped, because of poor quarters.

The city physician service appears to be overmanned; it is not properly directed and coordinated with other elements of the treat-

ment program. The nursing service should be so organized and expanded that groups of the population needing such service will have it available. Medical social service has not been developed on an adequate or a professional basis. The work up to the present is concerned mainly with the determination of eligibility for treatment, a purely clerical function of the admission desk. Medical social service should have for its purpose the detection and correction of social and economic maladjustments which may be determining or aggravating circumstances in the patient's illness.

There is grave doubt concerning the justice of the present financial, and to a certain extent, the residential, requirements governing eligibility for treatment in the Knoxville General Hospital proper and the out-patient department. Certain arbitrary limits have been established without considering living costs. In the out-patient department particularly, these limits are observed rather rigidly and without regard to type of treatment required or other demands on the patient's resources. At the present time there are no proper institutional facilities for patients suffering from mental disorders and from chronic illness, and for those convalescing from acute illness. The whole treatment program for both county and city patients would be strengthened through the joint use of facilities by both political units. A start in this direction has already been made in the maintenance of Beverly Hills Sanatorium. The plan should be extended.

RECOMMENDATIONS

1. All buildings of the Knoxville General Hospital, except the contagious disease unit, should be replaced by new and fireproof construction.

2. Pending the erection of new buildings, more adequate quarters should be provided for the out-patient clinics, particularly the venereal disease clinic, and for the hospital care of psychiatric patients.

3. In the future program of hospital construction provision should be made for psychiatric patients, convalescing patients, and patients with chronic disorders.

4. The work of the communicable disease hospital should be more definitely coordinated with the work of the bureau of health. The health officer or the epidemiologist should be placed on the hospital staff.

5. The necessity for the present number of city physicians should be critically reviewed. This service should be put on a full-time basis and be placed under the direction of the superintendent of the Knoxville General Hospital.

6. The present requirements governing eligibility for treatment should be reviewed with regard to their social and economic justice. Greater latitude should be allowed in interpreting these standards in

relation to type of treatment required and the demands on the patient's resources.

7. A program of home nursing care should be developed as the nursing resources of the bureau of health may permit.

8. Every opportunity should be embraced to develop plans whereby there may be joint utilization of facilities by city and county.

VARIABILITY IN POSTURAL RELATIONS

The Public Health Service has recently issued another bulletin on the subject of physical development and posture.[1] In this investigation 2,200 boys and men were given careful physical examinations and three photographs, profile, front, and back, were taken of each person, nude. In addition to summarizing such definitely quantitative information as was obtained with regard to postural relations, the bulletin presents a series of profile photographs chosen at random, representing individuals of all ages from 2½ years to more than 60 years.

The point of view of the report is that of determining how people stand, rather than what constitutes "good" and "bad" posture. Rigorous standards of objective and quantitative character were required for each step of the investigation. The discussion and conclusions have been confined to a description of relations actually found in the course of the investigation, with the few inferences which it appeared could be logically drawn.

The primary characteristic of all of the postural relations studied was that of variability, and this variability was particularly manifest in the presence of widely different postural characteristics in the same individual. No fixed types of posture could be found, even among the youngest children.

The specific conclusions of the investigation are technical in nature and can not be given in a brief summary. They are of a decidedly negative character and do not lend support to certain more or less established ideas. At every point in the investigation an unmistakable impression was obtained of the great variability in postural relations from person to person and the impracticability of establishing specific standards of posture.

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[1] Studies in physical development and posture. IV. Postural relations as noted in 2,200 boys and men. By Louis Schwartz, surgeon; Rollo H. Britten, associate statistician; and Lewis R. Thompson, Assistant Surgeon General. Public Health Bulletin No. 199. A previous bulletin in this series (No. 179) included the following reports on studies in physical development and posture: I The effect of exercise on the physical condition and development of adolescent boys; II. Bodily growth with age; and III. Physical fitness as reflected in tests of muscular strength. By Louis Schwartz, surgeon; Rollo H. Britten, associate statistician; and Lewis R. Thompson, Assistant Surgeon General.

DEATH RATES IN A GROUP OF INSURED PERSONS

Rates for Principal Causes of Death for March and First Quarter of 1931

The accompanying table, taken from the Statistical Bulletin for April, 1931, issued by the Metropolitan Life Insurance Co., presents the mortality record of the industrial insurance department of the company for March, 1931, as compared with that for the preceding month and for the corresponding month of last year. It also gives the rates for the first quarter of the years 1931 and 1930. The rates are based on a strength of approximately 19,000,000 insured persons in the United States and Canada. In recent years the general death rate in this selected group of persons has averaged about 72 per cent of the death rate for the registration area of the United States.

With regard to health conditions in this group during March the Bulletin states:

The March death rate (10.2 per 1,000) was well below the average for that month. In fact, it was lower than for any previous March, with only two exceptions. The usual seasonal rise, as compared with the mortality rate of February, was not in evidence this year. Among policyholders living west of the Rocky Mountains, the March death rate was identical with that of March, 1930; and among the Canadian policyholders, the 1931 figure showed a small decline; but among the great bulk of the insured, who live in the United States east of the Rocky Mountains, the mortality rate increased by 9.2 per cent.

Death rates (annual basis) per 100,000 for principal causes of death

[Industrial department, Metropolitan Life Insurance Co.]

Cause of death	Rate per 100,000 lives exposed [1]				
	March, 1931	February, 1931	March, 1930	Cumulative, January-March	
				1931	1930
Total, all causes	1,016.4	1,034.4	940.6	1,014.0	949.2
Typhoid fever	0.9	1.3	1.1	1.1	1.2
Measles	5.5	3.0	3.6	3.8	3.1
Scarlet fever	4.3	4.1	3.3	4.0	3.8
Whooping cough	3.8	4.6	4.2	4.2	4.8
Diphtheria	4.9	5.7	6.8	5.8	8.9
Influenza	52.2	58.6	25.3	47.7	27.4
Tuberculosis (all forms)	87.1	81.9	86.1	82.9	83.4
Tuberculosis of respiratory system	79.1	72.2	75.4	74.2	72.8
Cancer	83.6	84.0	74.2	84.3	74.8
Diabetes mellitus	23.8	25.3	19.6	24.4	20.8
Cerebral hemorrhage	64.5	64.2	62.9	67.8	63.0
Organic diseases of heart	170.3	171.9	159.5	172.6	163.2
Pneumonia (all forms)	126.0	146.7	119.0	130.9	114.2
Other respiratory diseases	13.2	15.1	14.0	14.0	13.2
Diarrhea and enteritis	9.5	9.1	11.1	10.4	11.5
Bright's disease (chronic nephritis)	73.6	75.1	70.7	74.8	70.7
Puerperal state	12.3	10.9	13.1	11.9	13.6
Suicides	9.5	9.3	9.8	9.0	8.8
Homicides	6.9	5.6	7.5	6.6	6.8
Other external causes (excluding suicides and homicides)	47.0	51.5	48.7	52.4	56.8
Traumatism by automobiles	16.3	15.3	13.9	18.3	17.1
All other causes	217.3	206.5	200.1	205.4	199.3

[1] All figures in this table include insured infants under 1 year of age. The rates are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.

FIRST QUARTER, 1931

With regard to the mortality for the first quarter the Bulletin notes that while it was higher than for the corresponding period of 1930 it was about the average for the past 10 years. Influenza and pneumonia caused more than one-sixth of the total number of deaths during this period.

In spite of the influenza epidemic, which might be expected to affect tuberculosis mortality, the death rate for tuberculosis continued to decline among the white policyholders. Among the colored, however, it was higher than for last year.

Measles, scarlet fever, and whooping cough showed no important changes from last year; but diphtheria again declined.

There was an abrupt rise in the death rate for cancer for both white and colored policyholders; but attention is called to the fact that too much significance must not be attached to figures for this disease for a single quarter.

Death rates for organic diseases of the heart, cerebral hemorrhage, and chronic nephritis increased appreciably among both white and colored, probably due in large part, it is stated, to the influenza outbreak.

The diabetes mortality also increased sharply as compared with the first quarter of 1930, the rise affecting both white and colored policyholders.

COURT DECISIONS RELATING TO PUBLIC HEALTH

Conviction for selling milk without having paid prescribed fees sustained.—(Arkansas Supreme Court; Belzung *v.* State, 36 S. W. (2d) 397; decided Mar. 16, 1931.) The appellant, a dairyman, was convicted of violating section 17 of certain rules of the district board of health of the Fort Smith district of Sebastian County, in that he had sold milk within the said city without having paid the fees provided for by the said section. Upon appeal, the conviction was affirmed by the supreme court, such court holding that (*a*) the special act under which the district board of health operated was constitutional; (*b*) section 17 of the rules was not in conflict with the regulations of the State board of health; (*c*) the district board of health had the power to promulgate section 17; (*d*) section 17 was not in conflict with the special act governing the district board; (*e*) the district board had the power to provide a penalty for violation of the rule; and (*f*) section 17 was reasonable and not discriminatory.

Injunction to restrain unlawful maintenance of piggery upheld.—(Pennsylvania Supreme Court; Commonwealth ex rel. Woods, Atty. Gen., *v.* Soboleski et al., 153 A. 898; decided Feb. 2, 1931.) The defendants maintained a piggery on their premises, and, on the

ground that it was a nuisance, suit was brought against them for an injunction. The trial court granted an injunction, and the defendants appealed to the supreme court. The latter court stated that there was evidence to sustain the lower court's finding that the pens constituted a public nuisance, it being pointed out that the piggery as maintained violated a statute prohibiting stream pollution. One of the defendants' contentions was that, inasmuch as the decree declared the manner of conducting their business to be in violation of the law and of regulations of the department of health, the penalties prescribed by the act relating to the creation of the department were the only penalties that could be decreed against them. In answer to this, however, the supreme court quoted from a previous decision as follows:

* * * It is not to be denied that the supreme court and the several courts of the common pleas have jurisdiction to restrain public nuisances, under certain circumstances. * * * The mere fact that there is a remedy at law by indictment or action will not alone prevent the exercise of the power.

DEATHS DURING WEEK ENDED MAY 2, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended May 2, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended May 2, 1931	Corresponding week, 1930
Policies in force	75, 137, 074	75, 786, 228
Number of death claims	15, 380	15, 962
Death claims per 1,000 policies in force, annual rate	10. 7	11. 0

Deaths [1] ***from all causes in certain large cities of the United States during the week ended May 2, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)***

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended May 2, 1931				Corresponding week, 1930		Death rate [2] for first 18 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (81 cities)	8,185	12.0	678	[4] 52	12.8	819	13.7	13.3
Akron	31	6.3	7	69	6.7	2	8.4	8.6
Albany [5]	35	14.1	2	40	13.9	1	15.4	17.0
Atlanta	81	15.2	12	123	18.4	6	16.3	17.2
White	46		7	111		4		
Colored	35	(6)	5	144	(6)	2	(6)	(6)
Baltimore [5]	229	14.7	20	68	16.2	14	16.9	15.7
White	166		12	52		11		
Colored	63	(6)	8	125	(6)	3	(6)	(6)
Birmingham	80	15.5	6	60	16.5	4	15.6	14.4
White	33		1	17		1		
Colored	47	(6)	5	122	(6)	3	(6)	(6)
Boston	236	15.7	26	74	17.3	25	16.4	16.3
Bridgeport	28	9.9	0	0	12.1	4	12.8	13.7
Buffalo	141	12.7	8	33	15.4	12	15.0	14.6
Cambridge	30	13.7	0	0	12.4	4	13.9	14.1
Camden	38	16.7	6	105	10.1	0	17.7	14.9
Canton	27	13.2	5	114	12.4	7	11.2	11.6
Chicago [5]	720	10.9	62	55	11.1	80	11.8	11.7
Cincinnati	127	14.5	5	30	17.5	9	17.9	17.3
Cleveland	198	11.3	10	29	14.4	26	12.6	12.5
Columbus	61	10.8	3	29	14.8	5	14.9	18.4
Dallas	69	13.2	8		10.5	8	12.7	12.4
White	54		8			6		
Colored	15	(6)	0		(6)	2	(6)	(6)
Dayton	30	7.6	3	42	8.8	2	13.2	10.5
Denver	78	13.9	4	39	13.4	13	15.6	15.5
Des Moines	36	13.0	2	35	13.1	3	12.0	12.5
Detroit	270	8.5	35	56	10.6	42	9.6	10.6
Duluth	20	10.2	2	49	10.3	1	11.6	11.4
El Paso	30	14.9	7		20.8	9	18.0	18.6
Erie	18	8.0	5	93	13.4	2	11.6	11.1
Fall River [5] [7]	22	10.0	4	91	12.2	7	13.5	14.1
Flint	23	7.3	2	26	10.6	5	8.0	10.2
Fort Worth	46	11.3	1		10.5	1	12.4	11.7
White	39		1			1		
Colored	7	(6)	0		(6)	0	(6)	(6)
Grand Rapids	24	7.3	2	30	14.2	3	9.7	11.8
Houston	60	10.1	4		10.9	10	11.8	12.8
White	49		4			5		
Colored	11	(6)	0		(6)	5	(6)	(6)
Indianapolis	98	13.8	4	33	13.4	5	15.2	16.0
White	83		3	28		5		
Colored	15	(6)	1	67	(6)	0	(6)	(6)
Jersey City	74	12.1	11	98	13.2	10	13.5	12.9
Kansas City, Kans.	25	10.6	4	82	10.3	4	15.1	12.3
White	23		4	98		3		
Colored	2	(6)	0	0	(6)	1	(6)	(6)
Kansas City, Mo	100	12.8	11	83	11.3	7	15.1	14.2
Knoxville	20	9.5	1	21	16.2	7	14.1	15.4
White	19		1	24		7		
Colored	1	(6)	0	0	(6)	0	(6)	(6)
Long Beach	21	7.2	1	24	10.9	0	10.8	10.6
Los Angeles	265	10.5	20	58	7.9	18	11.6	11.8
Louisville	52	8.8	3	26	14.6	7	16.6	14.7
White	41		3	30		7		
Colored	11	(6)	0	0	(6)	0	(6)	(6)
Lowell [7]	12	6.2	2	51	12.9	4	14.1	15.1
Lynn	20	10.2	0	0	13.2	3	11.8	12.2
Memphis	66	13.3	7	74	19.3	9	18.0	18.1
White	28		4	67		4		
Colored	38	(6)	3	87	(6)	5	(6)	(6)
Miami	20	9.3	1	25	12.2	3	14.3	13.0
White	11		1	35		2		
Colored	9	(6)	0	0	(6)	1	(6)	(6)

See footnotes at end of table.

Deaths[1] *from all causes in certain large cities of the United States during the week ended May 2, 1931, etc.*—Continued

City	Week ended May 2, 1931				Corresponding week, 1930		Death rate[2] for first 18 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1931	1930
Milwaukee	109	9.6	11	48	9.7	13	10.4	10.7
Minneapolis	94	10.3	6	39	11.2	7	12.1	11.4
Nashville	38	12.7	3	45	11.8	3	18.1	17.5
White	23	------	2	40	------	2	------	------
Colored	15	(6)	1	59	(6)	1	(6)	(6)
New Bedford[7]	32	14.8	1	27	9.7	3	13.5	12.4
New Haven	49	15.7	5	95	21.8	3	13.7	15.0
New Orleans	153	17.1	18	99	17.4	13	19.0	19.4
White	82	------	10	83	------	6	------	------
Colored	71	(6)	8	130	(6)	7	(6)	(6)
New York	1,536	11.3	122	51	12.4	164	13.1	12.2
Bronx Borough	213	8.3	7	16	8.6	14	9.5	8.7
Brooklyn Borough	491	9.7	39	41	10.8	68	12.2	11.3
Manhattan Borough	638	18.3	59	101	20.0	65	20.1	18.3
Queens Borough	152	6.9	14	38	7.2	14	8.5	7.8
Richmond Borough	42	13.4	3	54	17.0	3	14.2	15.4
Newark, N. J	[illegible]	11.6	9	47	15.3	17	13.5	14.1
Oakland	55	9.8	2	26	9.3	4	11.8	11.9
Oklahoma City	57	15.1	3	41	8.9	2	12.3	10.4
Omaha	63	15.2	2	22	14.8	5	14.6	14.8
Paterson	35	13.1	4	69	15.4	5	15.7	13.6
Philadelphia	524	13.9	40	58	13.2	46	15.7	14.0
Pittsburgh	186	14.3	18	62	16.9	19	17.6	15.8
Portland, Oreg	59	10.0	0	0	11.2	7	12.6	13.5
Providence	53	10.8	3	28	15.6	10	14.9	15.3
Richmond	53	15.0	2	29	15.4	3	17.7	16.3
White	33	------	2	44	------	1	------	------
Colored	20	(6)	0	0	(6)	2	(6)	(6)
Rochester	88	13.8	6	55	11.1	5	13.8	13.0
St. Louis	234	14.7	12	40	12.7	13	17.8	15.1
St. Paul	59	11.1	1	10	9.2	2	11.7	11.1
Salt Lake City[5]	39	14.2	5	74	12.2	5	13.4	14.2
San Antonio	90	19.5	19	------	17.4	13	15.6	18.4
San Diego	48	16.0	0	0	10.8	1	15.2	15.3
San Francisco	159	12.8	6	40	11.7	7	14.3	13.8
Schenectady	21	11.4	4	117	15.8	1	11.8	12.4
Seattle	84	11.8	3	28	11.9	4	12.9	12.0
Somerville	20	9.9	2	74	12.5	0	10.9	12.4
South Bend	16	7.7	0	0	9.9	1	9.2	9.9
Spokane	31	13.9	2	52	14.4	8	13.4	13.5
Springfield, Mass	45	15.4	6	92	13.5	2	13.7	14.3
Syracuse	54	13.2	7	83	14.4	8	13.0	13.1
Tacoma	24	11.6	1	26	10.7	1	14.8	13.3
Toledo	51	9.0	1	9	13.9	4	13.3	14.2
Trenton	33	13.9	2	35	19.0	8	19.3	17.9
Utica	25	12.7	0	0	16.9	4	16.2	17.4
Washington, D. C	156	16.5	20	111	16.5	17	18.1	16.3
White	86	------	7	57	------	11	------	------
Colored	70	(6)	13	223	(6)	6	(6)	(6)
Waterbury	24	12.4	6	181	8.3	1	11.3	10.6
Wilmington, Del.[7]	30	14.7	4	86	12.7	2	16.6	15.9
Worcester	43	11.4	1	14	16.3	8	15.0	15.5
Yonkers	20	7.5	5	131	7.7	1	9.9	9.3
Youngstown	35	10.6	0	0	11.9	7	11.6	11.1

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 76 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans, 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] *Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.*

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended May 9, 1931, and May 10, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 9, 1931, and May 10, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 9, 1931	Week ended May 10, 1930	Week ended May 9, 1931	Week ended May 10, 1930	Week ended May 9, 1931	Week ended May 10, 1930	Week ended May 9, 1931	Week ended May 10, 1930
New England States:								
Maine	1	1	3	2	4	101	0	0
New Hampshire	4	1			46	22	0	0
Vermont		1			1	42	0	0
Massachusetts	32	45	7	2	498	1,678	4	5
Rhode Island	8	9			99	6	0	1
Connecticut	9	11	7	10	582	61	1	1
Middle Atlantic States:								
New York	134	119	[1] 11	[1] 20	2,621	2,398	7	16
New Jersey	48	91	16	14	1,015	1,319	4	11
Pennsylvania	64	171			3,952	1,784	4	19
East North Central States:								
Ohio	28	29	24	11	575	491	2	6
Indiana	23	12	6		1,065	210	9	11
Illinois	124	128	6	56	1,831	728	18	19
Michigan	9	62		3	95	1,366	3	21
Wisconsin	13	15	14	11	620	569	2	4
West North Central States:								
Minnesota	5	7	3		188	208	2	2
Iowa	6	2			73	196	1	7
Missouri	23	92	8		647	164	8	1
North Dakota	5	1			70	21	1	1
South Dakota	16	3		2	37	63	0	0
Nebraska	9	10			3	330	1	1
Kansas	10	8	4	1	96	863	2	2
South Atlantic States:								
Delaware		3			193	28	0	0
Maryland [2]	11	10	14	13	1,246	119	1	2
District of Columbia	8	14	4	1	299	60	0	1
West Virginia	4	14	38	32	95	100	1	0
North Carolina	13	26	97	16	656	22	5	7
South Carolina	13	7	401	313	181		3	2
Georgia [3]	9	5	89	51	151	143	2	2
Florida	6	5	2		234	313	3	0
East South Central States:								
Kentucky	10				144	50	0	2
Tennessee	2	7	50	30	30	246	5	37
Alabama	12	6	50	26	304	131	8	1
Mississippi	9	4					2	5
West South Central States:								
Arkansas	5	4	27	23	74	63	1	5
Louisiana	44	11	15	42	4	20	4	2
Oklahoma [4]	9	7	55	24	18	345	0	3
Texas	23	28	50	35	114	301	0	2
Mountain States:								
Montana	2	3			14	29	0	0
Idaho						7	0	2
Wyoming		1				22	0	0
Colorado	5	11			183	884	0	0
New Mexico	1	6	2		58	47	3	3
Arizona	6	3	2	13	75	212	0	3
Utah [2]	5		1	4	6	382	1	1

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, 1931, 1 case in Georgia.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 9, 1931, and May 10, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 9, 1931	Week ended May 10, 1930	Week ended May 9, 1931	Week ended May 10, 1930	Week ended May 9, 1931	Week ended May 10, 1930	Week ended May 9, 1931	Week ended May 10, 1930
Pacific States:								
Washington	8	7	5	4	165	518	2	6
Oregon	8	5	25	16	185	111	0	1
California	88	55	55	22	1,309	2,114	6	3

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended May 9, 1931	Week ended May 10, 1930	Week ended May 9, 1931	Week ended May 10, 1930	Week ended May 9, 1931	Week ended May 10, 1930	Week ended May 9, 1931	Week ended May 10, 1930
New England States:								
Maine	0	0	20	33	0	0	0	2
New Hampshire	0	1	1	27	0	0	0	0
Vermont	0	0	0	6	2	3	0	0
Massachusetts	0	0	429	191	0	0	6	1
Rhode Island	0	0	70	22	0	0	1	0
Connecticut	0	0	47	88	0	0	0	1
Middle Atlantic States:								
New York	5	6	990	582	12	2	10	17
New Jersey	0	0	294	232	0	1	3	0
Pennsylvania	0	0	575	517	0	0	9	20
East North Central States:								
Ohio	2	1	341	185	37	95	14	3
Indiana	0	0	266	139	135	106	8	2
Illinois	3	0	509	397	49	86	7	7
Michigan	0	0	318	252	14	54	2	3
Wisconsin	1	0	161	165	11	21	2	0
West North Central States:								
Minnesota	1	1	87	102	10	3	1	2
Iowa	0	0	59	44	68	91	0	0
Missouri	2	0	225	94	29	47	6	17
North Dakota	0	0	30	9	9	4	1	1
South Dakota	0	0	28	25	15	36	0	0
Nebraska	0	0	39	49	33	53	0	0
Kansas	0	1	43	34	71	56	1	0
South Atlantic States:								
Delaware	0	0	21	6	0	0	0	0
Maryland [2]	0	1	68	124	0	0	1	2
District of Columbia	0	0	32	14	0	0	1	2
West Virginia	0	0	55	35	6	28	12	21
North Carolina	0	0	38	38	7	5	3	2
South Carolina	0	1	5	5	0	3	7	11
Georgia [3]	0	0	56	10	0	0	6	7
Florida	1	0	10	4	3	4	4	1
East South Central States:								
Kentucky	0	0	55	34	24	6	1	1
Tennessee	1	0	20	62	2	12	5	9
Alabama	1	0	17	15	10	2	4	14
Mississippi	0	0	11	4	25	6	4	7
West South Central States:								
Arkansas	1	0	15	11	7	4	9	1
Louisiana	0	0	18	18	19	13	10	16
Oklahoma [4]	0	0	22	37	74	122	4	7
Texas	3	0	51	42	35	152	5	4
Mountain States:								
Montana	0	0	38	34	1	9	2	0
Idaho	0	0	4	9	2	2	0	0
Wyoming	0	0	4	5	0	19	0	0
Colorado	0	0	55	28	6	21	0	4
New Mexico	0	0	8	4	4	15	2	1
Arizona	1	1	2	13	0	15	1	1
Utah [2]	0	0	5	9	0	0	1	0
Pacific States:								
Washington	2	0	60	33	29	85	5	3
Oregon	0	0	18	16	7	84	2	2
California	1	11	147	127	28	55	8	11

[2] Week ended Friday.
[3] Typhus fever, 1931, 1 case in Georgia.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
March, 1931										
Arkansas	10	20	1,125	44	127	73	0	92	107	10
Colorado	3	42	2		1,453		1	219	22	1
Wisconsin	10	55	508		1,887		6	654	24	5
April, 1931										
Alabama	36	65	1,195	74	1,611	60	0	101	56	19
Arizona	2	12	229		178		0	17	5	7
Connecticut	4	33	28		2,914		0	231	0	4
Georgia	1	22	1,377	105	471	40	1	315	25	6
Nebraska	3	37	8	1	24		1	144	139	1
North Dakota	2	19	6		233		1	84	31	6
Porto Rico		29	764	1,610	18	2	4		0	9
Tennessee	53	38	851	45	1,409	27	0	383	103	32
Wyoming	2	3	1		10		0	52	12	

March, 1931	Cases
Chicken pox:	
Arkansas	300
Colorado	378
Wisconsin	1,845
German measles:	
Colorado	2
Wisconsin	362
Hookworm disease:	
Arkansas	2
Lethargic encephalitis:	
Wisconsin	2
Mumps:	
Arkansas	82
Colorado	275
Wisconsin	3,382
Paratyphoid fever:	
Arkansas	2
Colorado	1
Septic sore throat.	
Colorado	6
Trachoma.	
Arkansas	7
Wisconsin	1
Undulant fever:	
Colorado	1
Vincent's angina:	
Colorado	1
Whooping cough:	
Arkansas	97
Colorado	283
Wisconsin	497

April, 1931	Cases
Chicken pox:	
Alabama	155
Arizona	38
Connecticut	346
Georgia	241
Nebraska	352
North Dakota	117
Porto Rico	25

Chicken pox—Continued.	Cases
Tennessee	263
Wyoming	109
Colibacillosis	
Porto Rico	1
Conjunctivitis	
Connecticut	25
Georgia	10
Wyoming	25
Dengue	
Georgia	1
Dysentery	
Arizona	3
Georgia	12
Porto Rico	41
Tennessee	2
Filariasis.	
Porto Rico	1
German measles	
Connecticut	39
Tennessee	7
Hookworm disease:	
Georgia	245
Impetigo contagiosa:	
Tennessee	1
Lead poisoning	
Connecticut	1
Leprosy	
Porto Rico	1
Lethargic encephalitis.	
Alabama	5
Tennessee	2
Mumps	
Alabama	185
Arizona	26
Connecticut	292
Georgia	127
Nebraska	628
North Dakota	104
Porto Rico	11
Tennessee	143
Wyoming	82

	Cases
Ophthalmia neonatorum:	
Connecticut	1
Porto Rico	7
Paratyphoid fever:	
Connecticut	1
Georgia	1
Porto Rico	1
Psittacosis:	
Georgia	1
Puerperal septicemia:	
Porto Rico	18
Tennessee	2
Rabies in animals:	
Tennessee	13
Rocky Mountain spotted or tick fever:	
Wyoming	5
Septic sore throat:	
Connecticut	17
Georgia	66
Tennessee	11
Tetanus:	
Porto Rico	9
Tetanus (infantile):	
Porto Rico	20

	Cases
Trachoma:	
Porto Rico	1
Tennessee	2
Trichinosis:	
Connecticut	2
Typhus fever:	
Alabama	6
Georgia	4
Undulant fever:	
Connecticut	3
Vincent's angina:	
North Dakota	49
Tennessee	4
Whooping cough:	
Alabama	93
Arizona	47
Connecticut	266
Georgia	57
Nebraska	78
North Dakota	44
Porto Rico	261
Tennessee	143
Wyoming	24

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 93 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 32,875,000. The estimated population of the 86 cities reporting deaths is more than 31,330,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended May 2, 1931, and May 3, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	931	973	
93 cities	405	523	737
Measles:			
44 States	19,997	19,914	
93 cities	7,937	7,996	
Meningococcus meningitis:			
46 States	155	192	
93 cities	60	100	
Poliomyelitis:			
46 States	22	18	
Scarlet fever:			
46 States	5,844	4,146	
93 cities	2,353	1,813	1,305
Smallpox:			
46 States	1,004	1,368	
93 cities	147	168	55
Typhoid fever:			
46 States	189	179	
93 cities	38	40	41
Deaths reported			
Influenza and pneumonia:			
86 cities	800	857	
Smallpox:			
86 cities	0	0	

City reports for week ended May 2, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine.								
Portland	1	1	0	...	0	0	2	3
New Hampshire:								
Concord	0	0	0	...	0	31	0	0
Vermont								
Barre	1	0	0	...	0	0	0	1
Burlington	1	1	0	...	0	0	0	0
Massachusetts:								
Boston	62	29	9	2	2	128	12	27
Fall River	0	2	3	...	0	11	4	0
Springfield	3	2	0	...	0	14	13	3
Worcester	5	3	0	...	0	3	10	3
Rhode Island:								
Pawtucket	8	1	0	...	0	2	4	4
Providence	12	6	2	...	0	23	4	6
Connecticut:								
Bridgeport	3	4	1	1	1	3	0	2
Hartford	0	4	0	1	0	34	1	9
New Haven	11	1	0	...	0	152	13	6
MIDDLE ATLANTIC								
New York:								
Buffalo	9	9	8	6	1	314	59	20
New York	337	240	94	11	10	1,457	65	186
Rochester	8	4	2	...	0	62	12	3
Syracuse	18	2	1	...	0	0	3	7
New Jersey:								
Camden	2	6	3	1	1	6	1	1
Newark	71	15	5	7	0	40	6	8
Trenton	5	3	3	3	0	6	5	0
Pennsylvania.								
Philadelphia	103	58	14	11	9	1,149	37	49
Pittsburgh	66	15	5	3	5	111	53	38
Reading	9	1	1	...	0	10	14	4
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	6	6	3	...	2	86	10	8
Cleveland	160	23	14	12	1	134	327	15
Columbus	8	3	3	1	1	4	8	2
Toledo	29	2	1	3	1	3	45	4
Indiana								
Fort Wayne	1	2	2	...	0	15	0	2
Indianapolis	42	3	1	...	1	372	34	11
South Bend	...	1	...	...	...	...	...	...
Terre Haute	1	0	0	...	0	3	0	1
Illinois:								
Chicago	100	83	92	4	1	540	54	46
Springfield	9	0	1	...	0	92	0	1
Michigan.								
Detroit	139	41	19	...	2	21	69	18
Flint	...	2	...	...	...	...	...	...
Grand Rapids	2	1	0	...	0	18	3	2
Wisconsin:								
Kenosha	1	0	2	...	0	0	139	1
Madison	13	0	1	...	...	6	81	...
Milwaukee	125	9	1	...	0	173	566	12
Racine	2	2	0	...	0	12	5	0
Superior	8	0	0	...	0	1	0	1

City reports for week ended May 2, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST NORTH CENTRAL								
Minnesota:								
Duluth	7	0	0		0	1	1	2
Minneapolis	110	11	5		0	77	150	5
St. Paul		7						
Iowa:								
Davenport	0	0	0			1	0	
Des Moines	4	0	2			0	1	
Sioux City	20	0	0			1	19	
Waterloo	0	0	0			2	0	
Missouri:								
Kansas City	22	3	5		1	196	0	10
St. Joseph	1	0	2		0	9	0	2
St. Louis	12	30	14	1	1	29	13	23
North Dakota:								
Fargo	2	0	0		0	1	22	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	5	0	0			4	0	
Nebraska:								
Omaha	28	2	4		0	6	43	9
Kansas:								
Topeka	7	0	0	1	1	3	67	2
Wichita	6	1	0		0	0	0	2
SOUTH ATLANTIC								
Delaware:								
Wilmington	2	2	1		0	71	3	8
Maryland:								
Baltimore	52	21	12	4	0	1,007	29	26
Cumberland	0	0	0		0	1	0	2
Frederick	0	0	0		0	10	0	0
District of Columbia:								
Washington	18	11	15	2	1	307	0	15
Virginia:								
Lynchburg	19	1	0		0	7	0	1
Richmond	0	2	2		1	276	0	1
Roanoke	2	0	0		1	1	2	1
West Virginia:								
Charleston	3	0	0		0	1	1	3
Wheeling	21	2	0		0	1	0	2
North Carolina:								
Raleigh	6	0	0		0	64	0	0
Wilmington		0						
Winston-Salem	10	0	0	1	0	70	13	5
South Carolina:								
Charleston	0	0	0	31	0	4	0	2
Columbia	0	0	2		0	0	5	7
Greenville	0	0	1		0	0	0	0
Georgia:								
Atlanta	6	2	1	23	4	27	0	10
Brunswick	0	0	0		0	0	8	0
Savannah	4	0	0	25	1	8	21	2
Florida:								
Miami	9	1	0		0	30	0	2
Tampa	4	1	2	8	2	105	0	3
EAST SOUTH CENTRAL								
Kentucky:								
Covington	1	0	1		0	11	0	4
Tennessee:								
Memphis	23	2	0		0	153	7	6
Nashville	0	1	0		0	71	0	2
Alabama:								
Birmingham	4	2	0	6	3	10	2	6
Mobile	1	0	0	1	0	0	0	1
Montgomery	0	0	0	3		0	2	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	6	0	0			3	0	
Little Rock	1	0	0		0	0	1	8

City reports for week ended May 2, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST SOUTH CENTRAL—continued								
Louisiana:								
New Orleans	1	8	9	2	3	0	0	11
Shreveport	2	0	0		0	1	5	2
Oklahoma:								
Muskogee	4	1	1		0	0	0	
Texas:								
Dallas	40	4	6	5	4	9	31	7
Fort Worth	11	1	0		1	1	3	9
Galveston	0	0	0		0	7	0	4
Houston	1	3	0		1	5	1	6
San Antonio	3	2	5		3	21	1	6
MOUNTAIN								
Montana:								
Billings	3	0	0		0	2	0	0
Great Falls	5	0	1		0	0	0	1
Helena	0	0	0		0	1	0	0
Missoula	5	0	0		0	0	0	0
Idaho:								
Boise		0						
Colorado:								
Denver	54	9	1		0	43	29	5
Pueblo	0	0	0		0	27	1	1
New Mexico:								
Albuquerque	2	0	0	1	0	1	0	1
Utah:								
Salt Lake City	13	3	1		3	2	4	0
Nevada:								
Reno	0	0	0		0	1	0	0
PACIFIC								
Washington:								
Seattle	77	2	3			9	50	
Spokane	14	2	0			5	0	
Tacoma	5	2	0		0	1	2	4
Oregon:								
Portland	13	6	1	2	3	16	22	3
Salem	4	1	0		0	11	15	0
California:								
Los Angeles	81	28	19	31	0	142	23	10
Sacramento	14	2	2	2	1	52	2	0
San Francisco	106	12	3		0	49	7	5

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	4	5	0	0	0	1	0	0	0	7	33
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	8
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	1	1
Burlington	0	0	0	0	0	0	0	0	0	6	8
Massachusetts:											
Boston	75	106	0	0	0	11	1	1	0	34	236
Fall River	4	9	0	0	0	1	0	0	0	1	22
Springfield	9	15	0	0	0	0	0	0	0	1	45
Worcester	7	41	0	0	0	6	0	0	0	12	43
Rhode Island:											
Pawtucket	0	6	0	0	0	0	0	0	0	2	12
Providence	12	41	0	0	0	1	1	1	0	2	53
Connecticut:											
Bridgeport	10	4	0	0	0	1	0	0	0	0	28
Hartford	5	11	0	0	0	5	0	1	0	5	52
New Haven	6	4	0	0	0	0	1	0	0	1	49

City reports for week ended May 2, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
MIDDLE ATLANTIC											
New York:											
Buffalo	25	18	0	3	0	11	0	0	0	28	137
New York	297	446	0	0	0	108	9	13	0	205	1,536
Rochetser	10	91	0	0	0	4	0	0	0	6	84
Syracuse	11	46	0	0	0	1	0	0	0	34	54
New Jersey:											
Camden	4	5	0	0	0	0	1	0	0	3	38
Newark	29	37	0	0	0	9	1	0	0	77	102
Trenton	4	6	0	0	0	1	0	1	1	0	33
Pennsylvania:											
Philadelphia	94	188	0	0	0	30	3	0	0	28	524
Pittsburgh	28	76	0	0	0	12	0	1	0	26	186
Reading	5	1	0	0	0	0	0	0	0	0	19
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	17	33	2	0	0	3	1	1	0	6	127
Cleveland	40	92	0	0	0	14	0	2	0	14	198
Columbus	7	7	0	0	0	2	0	0	0	0	61
Toledo	13	11	1	1	0	2	0	0	0	16	52
Indiana:											
Fort Wayne	4	5	1	0	0	1	0	0	0	1	18
Indianapolis	11	50	7	12	0	6	0	0	0	38	
South Bend	5		1				0				
Terre Haute	2	3	0	0	0	0	0	0	0	0	11
Illinois:											
Chicago	117	246	2	2	0	58	2	1	1	55	720
Springfield	3	2	0	0	0	0	0	0	0	0	18
Michigan:											
Detroit	111	143	1	3	0	31	2	2	0	126	270
Flint	11		2				1				
Grand Rapids	11	13	1	0	0	0	0	1	0	14	24
Wisconsin:											
Kenosha	2	3	0	0	0	0	0	0	0	0	7
Madison	1	2	0	0			0	0		1	
Milwaukee	26	30	1	0	0	2	0	0	0	26	100
Racine	4	9	0	0	0	1	0	0	0	23	12
Superior	2	0	0	0	0	1	0	0	0	0	7
WEST NORTH CENTRAL											
Minnesota:											
Duluth	7	0	0	0	0	1	0	0	0	0	20
Minneapolis	31	28	0	6	0	3	0	0	0	34	94
St. Paul	25		0				0				
Iowa:											
Davenport	1	1	1	10			0	0		0	
Des Moines	9	4	2	15			0	0		0	36
Sioux City	1	14	0	0			0	0		10	
Waterloo	2	0	0	0			0	0		5	
Missouri:											
Kansas City	20	8	1	0	0	9	1	0	0	18	100
St. Joseph	3	2	0	0	0	1	0	0	0	0	23
St. Louis	33	167	2	4	0	16	1	1	0	17	234
North Dakota:											
Fargo	2	8	0	0	0	0	0	0	0	13	7
Grand Forks	1	0	0	0			0	0		0	
South Dakota:											
Aberdeen	0	0	0	0			0	0		0	
Nebraska:											
Omaha	3	11	4	12	0	2	0	0	0	9	63
Kansas:											
Topeka	4	3	0	0	0	0	0	0	0	1	21
Wichita	3	4	1	36	0	1	0	0	0	11	31
SOUTH ATLANTIC											
Delaware:											
Wilmington	4	14	0	0	0	0	0	0	0	0	30
Maryland:											
Baltimore	38	44	0	0	0	13	2	3	0	23	229
Cumberland	0	1	0	0	0	0	0	0	0	0	11
Frederick	0	2	0	0	0	0	0	0	0	0	

City reports for week ended May 2, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
SOUTH ATLANTIC—continued											
District of Columbia:											
Washington	24	17	1	0	0	17	0	0	0	8	156
Virginia:											
Lynchburg	0	0	0	0	0	0	0	0	0	0	14
Richmond	8	10	0	0	0	3	1	0	0	0	44
Roanoke	1	3	0	0	0	1	0	0	0	0	16
West Virginia:											
Charleston	1	2	0	0	0	0	1	0	0	2	17
Wheeling	1	0	0	0	0	0	1	0	0	0	15
North Carolina:											
Raleigh	0	1	1	0	0	0	0	0	0	17	9
Wilmington	0		0				0				
Winston-Salem	0	1	1	0	0	1	0	0	0	14	
South Carolina:											
Charleston	0	0	0	0	0	0	0	0	0	0	27
Columbia	0	1	0	0	0	1	0	0	0	0	27
Greenville	0	0	0	0	0	0	0	0	0	0	
Georgia:											
Atlanta	4	39	2	3	0	5	1	2	2	18	81
Brunswick	0	0	0	0	0	0	0	0	0	0	3
Savannah	1	1	0	0	0	1	0	1	0	0	38
Florida:											
Miami	0	2	0	0	0	1	0	0	0	2	19
Tampa	0	1	0	0	0	0	1	1	0	0	20
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	14	0	0	0	1	0	0	0	0	19
Tennessee:											
Memphis	7	39	1	9	0	6	1	0	0	19	66
Nashville	1	8	1	0	0	2	0	0	0	3	38
Alabama:											
Birmingham	2	8	1	0	0	4	1	2	0	1	80
Mobile	0	0	0	1	0	0	0	0	0	0	16
Montgomery	1	1	0	0			0	0		1	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0			0	0		13	
Little Rock	0	3	0	0	0	6	0	0	0	0	
Louisiana:											
New Orleans	11	23	0	24	0	13	2	0	0	1	153
Shreveport	0	0	0	2	0	0	1	0	0	0	24
Oklahoma:											
Muskogee	0	0	2	0			0	0		0	
Texas:											
Dallas	4	11	2	0	0	0	1	0	0	36	60
Fort Worth	2	5	3	1	0	3	0	0	1	3	48
Galveston	0	0	0	0	0	0	0	0	0	0	21
Houston	1	2	1	4	0	5	0	0	0	0	60
San Antonio	2	0	0	0	0	9	1	0	0	0	90
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	0	8
Great Falls	1	0	0	0	0	0	0	0	0	13	8
Helena	0	4	0	0	0	0	0	0	0	0	8
Missoula	1	0	0	0	0	0	0	0	0	0	7
Idaho:											
Boise	1		0								
Colorado:											
Denver	12	17	0	0	0	7	0	0	0	24	81
Pueblo	0	0	0	0	0	0	0	0	0	8	10
New Mexico:											
Albuquerque	1	0	0	0	0	0	0	1	1	0	5
Utah:											
Salt Lake City	2	1	0	0	0	0	0	0	0	34	39
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	0

City reports for week ended May 2, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
PACIFIC											
Washington:											
Seattle	8	4	3	0	-	-	0	0	-	96	-
Spokane	5	0	7	12	-	-	0	0	-	1	-
Tacoma	2	2	3	1	0	0	0	0	0	6	24
Oregon:											
Portland	5	2	8	7	0	2	1	0	0	5	59
Salem	0	0	1	0	-	-	0	0	-	0	-
California:											
Los Angeles	30	32	6	12	0	24	1	2	0	29	265
Sacramento	2	1	1	1	0	3	1	1	0	35	26
San Francisco	22	9	1	0	0	11	0	0	0	58	157

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
MIDDLE ATLANTIC									
New York									
New York	6	5	4	1	0	0	1	0	0
Pennsylvania									
Philadelphia	3	1	1	0	0	0	0	0	0
Pittsburgh	3	2	1	2	0	0	0	1	1
EAST NORTH CENTRAL									
Ohio.									
Cincinnati	2	1	0	0	0	0	0	0	0
Cleveland	3	1	0	0	0	0	0	0	0
Indiana.									
Indianapolis	1	2	0	0	0	0	0	0	0
Illinois									
Chicago	14	6	1	1	0	0	1	0	0
Springfield	1	1	0	0	0	0	0	0	0
Michigan:									
Detroit	2	2	3	0	0	0	0	0	0
Wisconsin:									
Milwaukee	0	0	1	0	0	0	1	0	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	1	0	0	0	0	0	0	0	0
Iowa.									
Sioux City	2	0	0	0	0	0	0	0	0
Waterloo	1	1	0	0	0	0	0	0	0
Missouri:									
Kansas City	1	0	0	0	0	0	0	0	0
St. Louis	5	2	0	0	0	0	0	1	0
North Dakota:									
Fargo	1	1	0	0	0	0	0	0	0
Nebraska:									
Omaha	2	0	0	0	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	1	0	0	0	0	0	0	0	0
District of Columbia:									
Washington	5	1	0	0	1	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	1	1	0	0	0
Winston-Salem	0	1	0	0	1	0	0	0	0

City reports for week ended May 2, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
SOUTH ATLANTIC—continued									
South Carolina:									
Charleston	0	0	0	1	7	0	0	0	0
Columbia	1	3	0	0	0	1	0	0	0
Georgia:									
Savannah	0	0	0	0	6	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	2	1	0	0	0	0	0	0	0
Alabama:									
Birmingham	1	0	0	0	0	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	1	1	0	0	2	2	1	0	0
Oklahoma:									
Muskogee	0	0	0	0	1	0	0	0	0
Texas:									
Dallas	0	0	0	0	2	1	0	1	0
Houston	0	1	0	0	0	0	0	1	0
MOUNTAIN									
Colorado:									
Denver	0	1	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Tacoma	0	0	0	0	0	0	0	1	0
California:									
Los Angeles	0	3	0	0	0	0	1	2	0
Sacramento	1	2	0	0	1	0	0	0	0

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended May 2, 1931, compared with those for a like period ended May 3, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000, estimated population.

Summary of weekly reports from cities, March 29 to May 2, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Apr. 4, 1931	Apr. 5, 1930	Apr. 11, 1931	Apr. 12, 1930	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930
98 cities	53	79	65	93	66	86	53	91	[2] 64	88
New England	46	68	84	82	79	119	58	85	36	82
Middle Atlantic	48	74	59	92	62	83	46	99	61	72
East North Central	64	107	86	115	83	96	58	113	[3] 87	130
West North Central	42	52	63	89	63	87	67	68	[4] 64	68
South Atlantic	47	64	49	80	65	64	51	64	[5] 70	50
East South Central	29	30	17	6	23	18	23	48	6	0
West South Central	85	139	54	153	74	206	71	101	68	94
Mountain	44	26	35	79	17	9	26	88	[6] 27	44
Pacific	53	51	57	51	43	36	63	49	53	61

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931 and 1930, respectively.
[2] South Bend, Ind., Flint, Mich., St. Paul, Minn., Wilmington, N. C., and Boise, Idaho, not included.
[3] South Bend, Ind., and Flint, Mich., not included.
[4] St. Paul, Minn., not included.
[5] Wilmington, N. C., not included.
[6] Boise, Idaho, not included.

Summary of weekly reports from cities, March 29 to May 2, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

MEASLES CASE RATES

	Week ended—									
	Apr. 4, 1931	Apr. 5, 1930	Apr. 11, 1931	Apr. 12, 1930	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930
98 cities	1,122	1,001	1,326	1,195	1,316	1,227	1,342	1,356	[2] 1,259	1,293
New England	1,106	1,449	1,503	1,562	1,349	1,628	1,286	1,710	964	1,942
Middle Atlantic	1,250	789	1,422	966	1,543	1,097	1,418	1,192	1,411	1,284
East North Central	727	799	831	904	790	1,074	1,075	999	[3] 923	1,005
West North Central	532	860	704	1,199	589	1,009	830	1,352	[4] 692	1,003
South Atlantic	3,808	867	4,546	1,067	4,343	1,089	4,049	1,306	[5] 3,919	1,188
East South Central	1,501	526	1,751	329	1,612	299	1,600	407	1,426	185
West South Central	88	731	68	721	101	502	139	592	156	731
Mountain	661	4,731	844	7,674	923	6,793	661	8,802	[6] 686	5,912
Pacific	358	2,008	490	2,059	417	1,800	517	2,067	505	1,773

SCARLET FEVER CASE RATES

98 cities	371	301	362	320	382	298	405	262	[2] 373	296
New England	577	462	474	351	584	402	575	348	582	268
Middle Atlantic	404	293	413	281	415	262	488	239	409	285
East North Central	378	377	338	430	383	391	432	360	[3] 399	394
West North Central	585	271	537	399	518	366	469	248	[4] 521	384
South Atlantic	290	276	355	308	308	302	304	248	[5] 274	294
East South Central	396	143	465	132	582	143	396	126	407	132
West South Central	95	157	105	108	112	115	98	59	132	115
Mountain	157	238	174	335	278	352	191	229	[6] 199	361
Pacific	92	168	104	217	116	144	86	176	94	109

SMALLPOX CASE RATES

98 cities	14	23	19	29	22	27	21	30	[2] 23	27
New England	0	0	0	2	0	2	0	0	0	0
Middle Atlantic	0	0	1	0	2	0	1	0	1	1
East North Central	9	30	6	23	19	23	20	18	[3] 11	21
West North Central	78	87	96	149	92	139	71	145	[4] 123	132
South Atlantic	2	2	18	10	10	4	6	0	[5] 6	0
East South Central	12	0	0	12	52	18	35	42	58	36
West South Central	71	17	81	28	95	70	68	38	101	31
Mountain	0	106	17	62	9	26	17	97	[6] 0	150
Pacific	16	71	53	89	27	71	41	109	51	73

TYPHOID FEVER CASE RATES

98 cities	4	4	5	5	5	6	3	6	[2] 6	6
New England	2	5	2	0	2	7	2	5	7	2
Middle Atlantic	3	3	5	1	4	2	4	5	7	3
East North Central	2	2	3	1	2	2	2	6	[3] 4	6
West North Central	4	2	0	4	4	8	4	4	[4] 2	4
South Atlantic	14	4	16	22	8	22	2	12	[5] 14	6
East South Central	0	30	6	18	12	6	6	0	12	24
West South Central	10	10	3	7	7	7	0	24	0	21
Mountain	9	18	0	44	9	18	9	0	[6] 0	53
Pacific	2	6	8	4	10	8	4	4	6	6

[2] South Bend, Ind., Flint, Mich., St. Paul, Minn., Wilmington, N. C., and Boise, Idaho, not included.
[3] South Bend, Ind., and Flint, Mich., not included.
[4] St. Paul, Minn , not included.
[5] Wilmington, N. C , not included.
[6] Boise, Idaho, not included.

Summary of weekly reports from cities, March 29 to May 2, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

INFLUENZA DEATH RATES

	Week ended—									
	Apr. 4, 1931	Apr. 5, 1930	Apr. 11, 1931	Apr. 12, 1930	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr 26, 1930	May 2, 1931	May 3, 1930
91 cities	23	13	18	16	17	15	13	12	[2] 11	9
New England	2	7	19	7	7	7	7	12	7	5
Middle Atlantic	17	14	12	20	12	14	12	9	12	9
East North Central	18	10	14	8	10	12	6	14	[3] 5	7
West North Central	12	9	15	9	29	18	18	9	[4] 10	9
South Atlantic	39	8	30	26	32	22	10	12	[5] 20	16
East South Central	126	39	69	45	76	58	44	39	19	19
West South Central	69	36	45	25	45	25	55	25	38	21
Mountain	26	26	17	26	17	9	17	18	[6] 27	0
Pacific	14	0	19	12	10	2	5	0	2	5

PNEUMONIA DEATH RATES

91 cities	171	161	155	164	161	149	137	140	[2] 122	135
New England	127	181	173	186	144	160	132	189	154	164
Middle Atlantic	223	184	168	185	180	180	165	160	141	163
East North Central	120	146	118	127	128	114	98	108	[3] 75	107
West North Central	150	117	253	150	244	156	230	81	[4] 192	114
South Atlantic	221	196	199	230	188	202	168	210	[5] 176	204
East South Central	170	155	176	201	290	207	126	227	120	123
West South Central	238	164	169	181	173	121	145	132	152	110
Mountain	157	185	191	185	113	167	104	150	[6] 63	62
Pacific	53	62	60	72	67	37	46	50	46	42

[2] South Bend, Ind., Flint, Mich , St Paul, Minn., Wilmington, N. C., and Boise, Idaho, not included.
[3] South Bend, Ind., and Flint, Mich , not included.
[4] St. Paul, Minn., not included.
[5] Wilmington, N C., not included.
[6] Boise, Idaho, not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended May 2, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended May 2, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia		8			
New Brunswick [1]					
Quebec	1		1		9
Ontario	1	9		7	13
Manitoba					1
Saskatchewan				22	1
Alberta					2
British Columbia [1]					
Total	2	17	1	29	26

[1] No case of any disease included in the table was reported during the week.

Ontario—Communicable diseases—Four weeks ended April 25, 1931.—During the four weeks ended April 25, 1931, and the corresponding period of 1930, certain communicable diseases were reported in the Province of Ontario, Canada, as follows:

Disease	4 weeks, 1930		4 weeks, 1931	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis	12	5	4	
Chicken pox	836		696	
Diphtheria	167	7	118	7
Erysipelas	1		5	
German measles	791		67	
Goiter	2			
Gonorrhea	189		159	
Influenza	43	10	66	4
Lethargic encephalitis	2	1		1
Measles	2,785	4	228	
Mumps	152		398	
Paratyphoid fever			2	
Pneumonia		224		149
Puerperal septicemia	1			
Scarlet fever	1,049	5	502	
Septic sore throat	21	1	5	
Smallpox	74		[1] 12	
Syphilis	204		142	2
Trachoma			1	
Tuberculosis	131	70	109	52
Typhoid fever	5		24	2
Undulant fever	7		9	
Whooping cough	281	1	319	2

[1] The cases of smallpox were distributed as follows: Sault Ste. Marie, 4; Earnesttown, 3; and 1 case each in Thurlow, Percy Tp., Fredericksburg S., N. Plantagenet, and Gosfield N.

Quebec Province—Communicable diseases—Week ended May 2, 1931.—The bureau of health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended May 2, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Ophthalmia neonatorum	3
Chicken pox	74	Paratyphoid fever	1
Diphtheria	32	Poliomyelitis	1
Erysipelas	8	Scarlet fever	72
German measles	6	Tuberculosis	97
Measles	679	Typhoid fever	9
Mumps	22	Whooping cough	29

CHINA

Meningitis.—During the week ended April 11, 1931, 15 deaths from meningitis, among natives, were reported in Shanghai, China; 14 cases of meningitis, with 3 deaths, were reported among foreigners. During the week ended April 15, 1931, 5 cases of meningitis, with 1 death, were reported in Canton.

MEXICO

Mexico City—Typhus fever.—During the first four months of the years 1928, 1929, 1930, and 1931 typhus fever was reported in Mexico City, Mexico, as follows:

Month	1928		1929		1930		1931	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
January	10	3	6	1	12	5	36	31
February	6	1	8	3	12	1	43	24
March	21	6	7	1	6	1	215	75
April	10	2	13	2	4	3	[1] 98	[1] 38

[1] Includes only the first 11 days of April.

The total number of cases of typhus fever, with deaths, reported in Mexico City, together with the case mortality rates, for the years 1928 to 1931 were as follows:

Year	Cases	Deaths	Deaths per 100 cases
1928	157	26	16.5
1929	129	24	18.6
1930	120	39	32.5
1931 [1]	392	168	42.9

[1] Includes cases and deaths reported to Apr. 11, 1931.

SPAIN

Death rate—Years 1921 to 1929.—During the years 1921 to 1929 the mortality rates reported in Spain were as follows:

Death rates in Spain during the years 1921 to 1929

Year	Deaths per 1,000 population	Year	Deaths per 1,000 population
1921	21.32	1926	19.01
1922	20.48	1927	18.86
1923	20.74	1928	18.40
1924	19.78	1929	18.63
1925	19.67		

The midyear estimated population of Spain for the year 1925 was 22,222,919.

TRINIDAD

Port of Spain—Vital statistics—March 1930, 1931.—The following statistics for the months of March, 1930 and 1931, are taken from a report issued by the public health department of Port of Spain, Trinidad:

	March			March	
	1930	1931		1930	1931
Number of births	183	190	Death rate per 1,000 population	18.7	16.1
Birth rate per 1,000 population	32.0	32.6	Deaths under 1 year	12	16
Number of deaths	107	94	Deaths under 1 year per 1,000 births	65.6	84.2

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931			March, 1931				April, 1931				May, 1931	
						14	21	28	7	14	21	28	4	11	18	25	2	9
Ceylon: Colombo	C									1								
China.																		
Canton	C	1												1				
Shanghai	C	2																
India	C	18,944	11,112	10,687	15,334	3,529	2,549	3,173	2,293	2,471								
	D	9,782	5,933	5,689	8,123	1,846	1,325	1,703	1,257	1,252								
Bassein	C															2		
	D															2		
Bombay	C	19	13		21									2				
	D	17	7		9									1				
Calcutta	C	33	22	28	121	27	33	45	65	80	102	129	125	95	82			
	D	16	16	20	86	22	25	26	39	49	68	69	70	55	51			
Karikal	C			1		4		1	4	2	1	7	2					
	D					4			4	2	1	7	2					
Madras	C	1		201	99	18	20	19	15	4	5	7	4	3	1	4		
	D			67	47	5	4	14	6	5	3	2		5	1	3		
Negapatam	D				3	1		2										
Rangoon	C			1														
	D			1	1													
Tuticorin	C	1	5	1	1		1											
	D	1																
India (French):																		
Chandernagor	C	1	1	2	1		1	2	2	2	2	2	1			1		
	D			3	1		1	3	1	2	3	1						
Pondicherry	C	1	4	31	19	10	20	31	39	29	25	26	20	5	3			
	D		4	21	11	10	9	6	9	6	5	4	3	1	3			
India (Portuguese)	C	14		1														
	D	9																
Indo-China (see also table below):																		
Pnompenh	C	1	2		4		3	3	3					1	1			
	D		2		2		1	2	2		1					1		
Saigon and Cholon	C	1	3	9	6			3	1	1		1	3	2	3	7		
	D		1	4	3			3	1	2	1	1	1		3	6		
Persia: Rafsandjan	C																	31
	D																	12

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb 7, 1931	Week ended— February, 1931: 14	21	28	March, 1931: 7	14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9
Philippine Islands:[1]																		
Iloilo	C		1	1	2													
	D		3	1	2													
Provinces—																		
Capiz	C				59	69	54	28	35	29	11	4	4		3	8	18	11
	D				47	55	39	23	29	24	10	4	3		3	8	13	11
Iloilo	C	30	45	28	145	27	42	10	16	2	5							
	D	23	27	22	110	21	22	11	11	2	2							
Masbate	C									21								
	D									9								
Negros, Occidental	C	56	163	120	90	1	1	2										
	D	41	123	97	56	1	1	2										
Negros, Oriental	C				1													
	D				1													
Pampanga	C																	1
Samar	C	16	8	17														
	D	12	8	9														
Sorsogon	C	5																
	D	4																
Siam	C	4	6	2	3		1				4	4	2					
	D	4	6	2	1						1	1						
Ayudhaya District	C												1					
Bangkok	C	3	4	2	3	1			1		1	1		1		1		
	D	2	4	2	1				1		1	1						
Bismulok Province	C										4	4						
	D										1	1						

Place		October, 1930	November, 1930	December, 1930: 1–10	11–20	21–31	January, 1931: 1–10	11–20	21–31	February, 1931: 1–10	11–20	21–28	March, 1931: 1–10	11–20	21–31
Indo-China (French) (see also table above):															
Cambodia[1]	C	22	26	28			7	19	36		35				65
Cochin-China[2]	C	26	13	8			7	4	13		5				33

[1] Reports incomplete.

[2] Figures for cholera in the Philippine Islands are subject to correction.

PLAGUE

Place		Oct. 19-Nov. 15, 1930	Nov. 16-Dec. 13, 1930	Dec. 14, 1930-Jan. 10, 1931	Jan. 11-Feb. 7, 1931	Week ended—												
						February, 1931			March, 1931				April, 1931				May, 1931	
						14	21	28	7	14	21	28	4	11	18	25	2	9
Algeria:																		
Algiers	C	11	2	1	2	1							1					
	D	3											1					
Bone	C				1													
Constantine, vicinity of	C	1		50	1	1												
	D				1													
Oran	C	2																
	D	1																
Plague-infected rats		1																
Philippeville	C	2		1														
	D			1														
Argentina:																		
Cordoba Province	C				1		2											
Entre Rios Province—Diamante	C							2										
Jujuy Province—Palpala	C				1		1											
Sante Fe	C						2											
Belgian Congo	C	1	1								2							
	D	1	1								2							
British East Africa (see also table below):																		
Tanganyika	C		3	2				15	7		8							
	D		3	2				4			1							
Uganda	C	171	111	67	25	6	4		5	4	7	4						
	D	168	112	67	24	6	4		5	4	7	4						
Ceylon: Colombo	C	1	9	9	8	6	2	1	2	1	3	3	1	1	3			
	D	1	8	9	6	7	2	1	3	1	3	2	1	1	2			
Plague-infected rats		1	2		2	1	1	1			3	1			1			
China: Shensi	C	1																
Dutch East Indies:																		
Batavia and West Java	C	143	208	239	180	29	36	46	30	18	31							
	D	146	206	238	168	29	35	46	28	17	28							
East Java and Madura	C				4			1		1								
	D				4			1		1								
Java and Madura	D	501	557	615	427	89	108	99	80	65	81	68	63					

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931: 14	21	28	March, 1931: 7	14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9
Egypt:																		
Alexandria	C	7	4	3	1	1			1	1								
	D	7	1															
Plague-infected rats			3	1	1		1											
Assiout	C	3	9	7	26	9		17	15	6	10	1	1	5	16	8	3	4
	D	1	1	1	6	4		3	4		4	1	1		11	4	2	2
Aswan	C		3															
Beni-Suef	C				1											10	2	3
	D				1											3		1
Cairo	C												1					
Deirout	C				21	6	10										3	7
	D				4		4										1	2
Gharbieh	C				1													
	D				1													
Girga	C			7	1						14	37	35	31	9	4		1
	D			2	1						2	5	17	13	3	5	1	1
Kena	C											5				3		
	D											2				1		
Manfalut	C			23	30	11		2	2	3	5	9						
	D			5	6	4		1			2	1						
Minieh	C		1		2						2	1			1			5
	D				1						1	1						2
Port Said	C	2																
France: Marseille	C	4																
Greece (see table below).																		
India	C	2,721	3,259	3,749	5,335	1,270	1,095	1,726	1,366	2,674								
	D	1,497	1,856	2,223	3,422	862	774	1,213	812	1,887								
Bassein	C	1		2	4				1								1	
	D			1	3	1												
Bombay	C	1			1	1				1	1	1	1	4	4	1		
	D	1			1	1					2	1		4	4			
Plague-infected rats		30	32	38	34	14		8	10	17	14	21	18	34	43	30		
Calcutta	C													1	1			
	D													1	1			
Madras Presidency	C	185	148	220	312	30	19	13	12	9	12							
	D	124	78	154	182	17	18	7	4	4	12							
Rangoon	C	2		2	2							1		1				
	D	1		1	1							1		1				
Plague-infected rats		1	4	2	4		8						1	1	3			
India (Portuguese)	C	3																
	D	3																

Indo-China (see also table below): Pnompenh	C		6	1	7				1									
	D	1	6	1	7		1	2	1	2	1	1	2	2	1	1		
Iraq. Baghdad	C	P	4		5			1	2	1	3	3	1		5	10	8	7
	D		2		4				2		3	1	1		2	5	1	3
Madagascar (see also table below): Tamatave	C	5	4	2	9													
	D	3	3															
Morocco	C	5		19	13													
	D			8	4													
Nigeria: Lagos	C	38	9	5	1									2				
	D	5	9	5	1									2				
Plague-infected rats		13	5	5														
Peru (see table below).																		
Senegal (see table below).																		
Siam	C	6			4	5	9	3	1	2	2							
	D	5			2	4	6	4		1	1							
Bangkok	C	1	1	3	8	1	2	3		29								
	D	1	1	3	8		1	4		6								
Nagara Rajsima	C	1	11	17	9	7						1						
	D	1	9	10	10	6												
Syria: Beirut	C	6		1	1		1											
Tripolitania	C	1	13		8		1			1								
	D		1		3													
Tunisia: Tunis	C	1	P	13	1		9	2	3		5		5	5	7		4	
	D						7						4	4	2		2	
Union of Socialist Soviet Republics:																		
Gouranduz	D				28													
Transcaucasia—Karabakh	C				6													
Union of South Africa.																		
Cape Province	C	1	P															
Orange Free State	C			2	P	P	1	P		2		4						
	D			2			1					1						
On vessel: S. S. Mariongo de Thermiotis at Avonmouth	C			1														

Place		Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931
British East Africa (see also table above).							
Kenya	C	53	58	62	50	69	21
Greece	C		2				
Indo-China (see also table above)	C	5	2	5	1		
Madagascar (see also table above)							
Ambositra Province	C		4	44	95	100	
	D		4	44	87	96	
Antisirabe Province	C	21	3	18	27	66	
	D	21	3	18	26	57	
Miarinarivo Province	C	7	18	12	18	28	
	D	7	18	12	18	26	
Moramanga Province	C	18	20	19	13	7	
	D	17	20	19	11	5	
Tananarive Province	C	79	125	170	178	92	
	D	79	116	164	172	89	

Place		Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931
Peru	C	10	42	31	8		
	D	2	20	14			
Senegal							
Baol [1]	C	48	53				
	D	13	35	4			
Dakar [1]	C	3					
	D	8					
Louga [1]	C	61	37	10			
	D	30	25	3			
Rufisque [1]	C						2
Thies [1]	C	12	24	27	2		
	D	4	15	23	1		
Tivaouane [1]	C	20	53	31	2		
	D	14	31	25	1		

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931 14	21	28	March, 1931 7	14	21	28	April, 1931 4	11	18	25	May 2, 1931
Algeria:																	
Algiers	C			1	1		1					2			2		
Bone	C				1												
Constantine	C	1									1						
Oran	C		3														
Arabia: Aden	C				1	1											
Belgian Congo	C			79	50												
Belgium	C					1											
Brazil:																	
Porto Alegre (alastrim)	C	28	36		3	1	1	2	3	7	12	16	14				
	D								1				1				
Rio de Janeiro	C	2															
British East Africa (see also table below) Tanganyika	C	17	385	84	70	35	42	13	1	6	2						
	D	1	36	4	5		12	1		1	2						
British South Africa: Southern Rhodesia	C	95	18	18	3												
	D		3														
Canada:																	
Alberta	C		1	19	7	1											
British Columbia	C	3	1	3	2	1	2	5									
Manitoba	C				1			1									
Winnipeg	C			1				1									
Nova Scotia	C				1							1					
Ontario	C	59	23	17	49	10	4	7	8	2	3	3	1	4		6	7
Kingston	C			6	1		1									2	3
North Bay	C			2		1											
Ottawa	C	37	12	2	3		1										
Sault Ste. Marie	C			1	30			2						3	1		
Toronto	C		4							1		1			4		
Quebec	C		2		2												
Saskatchewan	C	2	18		38	17	18	18	10	40	10	8		5	16	3	22
Regina	C						1					2				2	
Canary Islands: Las Palmas	C											1					
China:																	
Canton	C					2			1	1	2	2	2	1	2	1	
Chungking	C	P	P	2													
Foochow	C	P	P	P	P		P		P		P		P				

Hong Kong	C			1	1	2	5		2			1	1		1	2
	D					1	1	1				2				1
Manchuria—																
Harbin	C	1			1			4		1						
Kwantung—Dairen	C		4	1								2				1
	D		1													
Nanking	C	P	P	P	P	P	P	P	P		P	P	P	P	P	
Shanghai—																
Foreigners only	C	2	8	14	12	4	7	2	3	3	1	1	1	2	1	2
Including natives	D	1	4	11	13	5	2	4	3	5	2	2	1	2	7	4
Swatow	D	3	3	5	7		3	3	7	3	6	9	8	2		
Tientsin	C	1	2		1											
Chosen (see table below).																
Colombia: Cali	D		1													
Dutch East Indies:																
Java—Batavia and West Java	C	26	6	4	29		2			1						
	D	4	2	2	2	1										
Sanggi Islands	C	29														
	D	3														
France (see table below).																
Great Britain:																
England and Wales	C	372	508	665	958	221	50	247	227	171	219	226	179	177	163	212
Bradford	C	1	1	1	4		1				1		1	1		1
Leeds	C	2		2									1		1	1
London	C	172	184	161	149	23	16	23	36	26	54	32	35	51	39	84
London and Great Towns	C	236	433	560	693	150	186	189	158	117	154	166	117	142	126	162
	D	1	1				1									1
Sheffield	C				3		16	6	10	2	1	6	1	4	2	1
Stoke-on-Trent	C	1			1				1							
Greece (see table below).																
Honduras.																
Amapala	C								1							
Ocotepeque and Gracias districts	C								P							
Puerto Castilla	C			4	11	3										
Tegucigalpa	C															1
Tela	C													1		
India	C	2,412	3,627	5,623	9,623	2,996	2,766	3,003	3,457	3,440						
	D	606	874	1,381	2,245	665	520	706	669	655						
Bombay	C		1	2	7		1	3	2	4	1	4	1	2	2	1
	D		1	2	1		1	1	1		1	2	1	1		
Calcutta	C	9	18	59	143	35	51	83	82	53	69	75	86	101	60	
	D	7	11	40	100	26	41	66	55	36	54	50	63	78	42	
Cochin	C	25	22	15	29	19		16	24	15	17	14		10	11	12
	D	3	4	1		1		1	1							
Karachi	C		3		3			4			3		1		5	
	D		1		2							2				
Madras	C	9	20	4	16	4	1	3	1	6	3	9	4	12	4	1
	D	2	3				1				2	1		2	1	1
Moulmein	C				2											
Negapatam	C	9	6											1	1	
Rangoon	C	1	1			2		1	1	1	1	1		2	2	1
	D	1								1						
Vizagapatam	C				1			8		1		1		2	2	4
	D							2				1		1		1

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931: 14	21	28	March, 1931: 7	14	21	28	April, 1931: 4	11	18	25	May 2, 1931
India (French):																	
Chandernagor	C	3		5	9	2		6	6	3	3	6	2				
	D	1		3	1			1					2				
Karikal	C			3	5	2		16	1			3					
	D			2	4	2		16									
Pondicherry Province	C	11	19	34	45	1	1	10	7	7		4	3	3			
	D	11	17	32	45	1	1	10	7	7		4	3	3	3		
India (Portuguese)	C			4	5	2	3	6	3								
	D					2		1									
Indo-China (see also table below):																	
Pnompenh	C		1	2	1					1							
	D		1		1												
Saigon and Cholon	C	2	2		6		2	2		4	1	1	2	1			
	D	2	2		4			1		3	1	2	2	1			
Iraq:																	
Baghdad	C							3	6								
Mosul Liwa	C	6	16	1	3		5										
	D		2				1										
Ivory Coast (see table below).																	
Japan:																	
Kobe	C							1	1								
Taiwan	C				1												
Mexico (see also table below):																	
Jalisco (State)—Guadalajara	D	3	3		1							1					
Juarez	D	1															
Mexico City and surrounding territory	C	9	6	10		7	5		11	13	13	7		17	9		
	D	2	6	6	1	1	3	2	2	5	5	6	6	4	6		
Torreon	C														1		
	D														2		
Vera Cruz	C	1				1		1	1		1	1			1		1
Morocco (see table below).																	
Nicaragua: Porto Cabezas	C			2													
Nigeria: Lagos	C											2					
Panama Canal Zone	C				2												
Poland	C	8	3	25			1										
Portugal: Lisbon	C	20	37	72	103		12	19	9	16	15	17	4	8	18	11	
Siam	C			1	4	1	1										

Somaliland, British: Boales	C	1	1														
	D			1													
Spain	C	P	P	P	P	P	P	P	P	P	P	P					
Straits Settlements	C	10	17	6	7			2				2	1	1		1	
	D	2	7	3	1			1				1		1	1		
Sudan (Anglo-Egyptian)	C	5	50	64	11	1	1	44	51	3	1	4					3
	D	1	5	6	7			6	4		1	1					
Sudan (French) (see table below).																	
Syria (see table below).																	
Tunisia: Tunis	C			17	8							4					
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P	P	P				P								
Orange Free State	C	2	P		P			P	P			P					
Transvaal	C	P	P	P	P	P	P	P	P	P		P					
Upper Volta	C		6	4			8	10				3			3		
	D			2								1					
On vessel:																	
S. S. Clan Mactoggart at Suez	C					2											
S. S. Muncaster Castle at Manila from Hong Kong	C			1													
S. S. Matheran at Suez from Calcutta	C				1												
S. S. Clan Buchanan at Suez	C							2									
S. S. Rotterdam at Naples from Venice	C											1					
S. S. Clan McTavish at Manila from Chittagong	C														1		
S. S. Benventie at Sydney from Shanghai	C				1												
S. S. Clan MacBrayne at Cochin	C					1											
S. S. Chilka at Rangoon	C						1										
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C																1

Place		Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931
British East Africa (see also table above)							
Kenya	C	424		653			
Chosen	C	3	22			1	
	D	5	6			1	
France	C						16

Place		Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931
Greece	C				4		4
Mexico (see also table above)	D	822	893		1		3
Morocco	C	4	4	20	25		4
Turkey	C	19	74	65	116		37
	D	2	1	1	9		6

Place		October, 1930	November, 1930	December, 1930			January, 1931			February, 1931			March, 1931		
				1–10	11–20	21–31	1–10	11–20	21–31	1–10	11–20	21–28	1–10	11–20	21–31
Indo-China (see also table above)	C	258	86	38	9	14		48	46		46				139
Ivory Coast	C	4	2	9											
Sudan (French)	C	17		43		96							4		P
	D	2		16		4									
Syria: Beirut	C							1							

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Oct. 19–Nov. 15, 1930	Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Week ended— January, 1931: 17	24	31	February, 1931: 7	14	21	28	March, 1931: 7	14	21	28	April, 1931: 4	11	18	25	May 2, 1931
Algeria:																				
Algiers	C	1	2						1	1					3					
Constantine Department	C	1	2	6		6	6	19			4			1		2	2			
Oran	C		5			1	2					1								
Australia; western	C															1				
Bulgaria	C	3	11	3	9	2	1	1		2		3				9		26		
	D			1												2		3		
Chile: Valparaiso	D													1						
China:																				
Canton	C					2							1							
Manchuria—Harbin (see also table below)	C		1			3					5									
Shanghai	C					2														
Tientsin	C		1														1			
Chosen (see table below).																				
Czechoslovakia (see table below).																				
Egypt:																				
Alexandria	C	2	2															1		
	D	2																		
Beheira Province	C			1													3			
	D			1													2			
Cairo	C		1	1				1												
Port Said	C	2				1														
Eritrea: Asmara	C												1							
Great Britain: Scotland	C							1												
Glasgow	C						2													
	D						1													
Greece (see table below).																				
Guatemala.[1]																				
Iraq: Baghdad	C								2	1	1	1	1						2	
	D								1										2	
Irish Free State: Mayo County—Belmullet	C																	1		
Lithuania (see table below).																				
Mexico (see also table below):																				
Durango	D						1													

Mexico City, including municipalities in Federal District	C	11	14	12	13	12	6	8	13	13	9		46	66	73	31	67	34		
	D	4	7	10	8	9	9	8	4	7	5		20	13	31	20	18	7		
San Luis Potosi	D		2						2	2		1	1	1	2	1	1	2		
Morocco	C	3	1	8			6	2	7	8	5	8	2	2	3			1		
	D					2				1										
Palestine	C	3	7	4	1	1			3				2	1	1	1	1	2		2
Paraguay: Asuncion	D					2	2													
Poland	C	37	42	63	19	21	16	50	49	41	43	56	62	58	85	82	93	176		
	D		7	3	2	1	4	1	3	3	4	9	4		7	4	8	7		
Portugal: Oporto	C	4	6			1														
Rumania	C	41	34	113	54	43	51	45	49	53	12	38	55	53	52					
	D	2	3	5	1	7	6	2	5	11	3	5	4	5	3					
Spain	C	4	1																	
	D		1																	
Tunisia:																				
Sbeitla vicinity of	C															20				
	D															7				
Sfax	C														2					
Tunis	C		28			7	4	5			6	12	5	2	7		2			
Turkey (see table below).																				
Union of South Africa.																				
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	1		P					
Municipality of East London	C	1	1	3		1	1	1							P					
Natal	C	P		P	P	P	P	P	P	P				1	P					
Orange Free State	C	P		P	P	P	P	P	P		P	P	P							
Transvaal	C	P	P	P	P	P	P	P	P	P	P	P	P		P					
Yugoslavia (see table below).																				

Place		Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931
China: Harbin (see also table above)	C	3					
Chosen: Seoul	C	7	1	1	1		
Czechoslovakia	C		16	24	60		
Greece	C	4	4	10	10	17	8
	D				2	2	1

Place		Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931
Lithuania	C	1	5	6	26	3	22
	D		1	3	3	1	2
Mexico (see also table above)	D	47					
Turkey	C	28	3	2		18	
Yugoslavia	C	2	2	1	20		
	D	1		1	2		

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reports an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

	Cases	Deaths
Brazil:		
Bahia State—		
Mar. 14, 1931	1	
Mar. 15-21, 1931	1	
Ceara State—Mar 14, 1931	2	
Barbalha, Feb. 7, 1931	1	1
Minas Geraes State—		
Mar. 20, 1931	2	
Apr 5-11, 1931	1	
Apr. 19-25, 1931	2	1
Rio de Janeiro State—		
Mar. 7, 1931	1	1
Brazil—Continued.		
Rio de Janeiro State—Continued.		
Mar. 14, 1931	1	1
Mar. 21, 1931	1	1
Cambucy—		
Jan. 1-25, 1931	3	3
Feb. 1-7, 1931	1	1
Friburgo (imported), Jan. 25-30, 1931	1	
Padua—		
Jan 18-24, 1931	1	1
Feb. 1-7, 1931	1	1
Feb. 8-14, 1931	1	

UNITED STATES TREASURY DEPARTMENT

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SPECIAL ARTICLES

Development of the Proposed Morbidity Reporting Area

Cystine Amine Replaces Cystine in Promoting Growth

The Rate of Disappearance of Oxygen in Aerated Sludge

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of public health.

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PUBLIC HEALTH REPORTS

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DEVELOPMENT OF THE PROPOSED MORBIDITY REPORTING AREA[1]

By R. C. WILLIAMS, *Assistant Surgeon General, United States Public Health Service*

At the two preceding meetings of this conference there were presented for your consideration certain suggestions relative to the establishment of a proposed morbidity reporting area. It appears to be the general consensus of opinion that in order to encourage the reporting of notifiable diseases and to secure certain and fairly comparable reports from the several States it was desirable to establish a morbidity reporting area. The purpose of this report is to present the results of the experience of the past three years in considering the feasibility and practicability of the establishment of such an area.

During the year 1930, surveys were conducted by State and local health officers, at the suggestion of the Public Health Service, in 5 States, 35 cities, and 101 counties, in an attempt to ascertain the completeness of reporting by the systems now in use. It was the expectation that those jurisdictions which could show that they were securing reports of 75 per cent of the cases of diphtheria, poliomyelitis, scarlet fever, smallpox, typhoid fever, and tuberculosis actually occurring should be admitted to the proposed morbidity reporting area. It is desired to acknowledge here, with thanks, the splendid cooperation given the Public Health Service in this matter by those State and local health officers who conducted state-wide and local surveys. The results of the state-wide surveys were most informative. The efforts of those State health officers in conducting such state-wide health surveys are especially appreciated. The data which were made available through such surveys have, perhaps, never been collected before on such a broad scale. In general it may be said that these state-wide surveys show that certain diseases are well reported in some States, while the same diseases may be poorly reported in other States.

It was evident that tuberculosis was poorly reported in all States. In general it is believed safe to state that the completeness of the reporting of the communicable diseases is below what was expected.

[1] Presented at the Twenty-ninth Annual Conference of State and Territorial Health Officers with the United States Public Health Service, Washington, D. C., Apr. 28, 1931.

It is doubtful that in many States more than 50 per cent of the cases actually occurring are reported to health officials.

These surveys have been most useful, as they emphasize quite clearly the present inadequacy of the reporting of communicable diseases throughout the country and the need for improving reports dealing with the prevalence of diseases.

The results of the surveys conducted in this manner as a whole have not been satisfactory, although much valuable information relative to morbidity reports and reporting has been secured. The principal difficulty encountered was that in many jurisdictions the number of cases was too small to give reliable information as to the completeness of the reporting. It will be recalled that the purpose of these surveys was to reach at least 1 per cent of the population and endeavor to check the cases of certain communicable diseases found against those reported to the health authorities.

Several plans for the establishment of a morbidity reporting area have been proposed. In 1916 Dr. John S. Fulton, then State health officer of Maryland, presented to the conference a plan for the establishment of an "area of known disease prevalence," based on case fatality rates. He computed fatality rates for measles, scarlet fever, diphtheria, and typhoid fever for the four years 1912 to 1915, including the States which were in the registration area for deaths.

The Public Health Service has considered at least two plans for the establishment of such an area, neither of which so far has appeared to be entirely practicable. As a further method of developing the reporting of communicable diseases, the Public Health Service had planned to secure the reports from the reporting area by payment to State health departments of 5 cents for each transcription of the original report of a case, but so far appropriations for this purpose have not been obtained. This particular method has several points to commend it. It would allow the Public Health Service to secure copies of the original reports. These would be of great value in making mass epidemiological statistical studies. No doubt much important information could be obtained from such statistical investigations. Another factor is that it would remunerate the State health department for its work and thus, in some instances, provide almost enough income to maintain an employee whose entire time could be given to the stimulation and improvement of disease reporting.

About a year ago the New York State Health Department suggested a tentative plan for determining admissibility to the morbidity reporting area, the principal feature of which was a comparison of the case fatality rates. This plan has been extensively modified and is being presented for your consideration.

After the computations made by the Public Health Service had been completed, it was found that the list of States having case fatality

rates which indicated better than average morbidity reports was exactly the same as the list prepared by the New York State Health Department, although the computations were made in a different way and the years included were not the same.

It is believed that the plan herein described can be put into operation without specific appropriations at the beginning, and if it is approved by this conference it is probable that the actual work of securing morbidity reports from the area can be begun within a few months. This plan is based (*a*) on the facilities of the health department for collecting reports of cases of notifiable diseases and (*b*) on the case fatality rates for five diseases for three years. The requirements are as follows: (1) Inclusion in the registration areas for deaths and births; (2) adequate legislation to enforce reporting; (3) machinery for securing reports and keeping records; (4) a clerical force sufficient to do the work required; and (5) a willingness to cooperate in efforts to secure more nearly accurate and more nearly complete reports of morbidity.

Consideration is given to the results of the survey of the completeness of morbidity reporting which was conducted during 1930 in all States where this survey was made. In addition, the reports to the Public Health Service for the years 1927, 1928, and 1929 have been examined and an analysis of these reports on the basis of case fatality rates has been made. The diseases used in the analysis were diphtheria, measles, scarlet fever, typhoid fever, and whooping cough.

For each year for each disease we calculated a fatality rate based on all cases and deaths reported to the Public Health Service by all States which were in the registration area for deaths. This gave 15 standards, each of which was practically the average fatality rate for one year for one disease in the entire death registration area.

The reciprocal of each fatality rate for each State was divided by the reciprocal of the proper standard fatality rate, and the resulting percentages were tabulated. The percentages for each State for the three years were averaged, and then these separate averages for the five diseases were again averaged. This gave a single percentage for each State, which percentage was based on the fatality rates for three years for the five diseases. States showing a general average of more than 100 per cent (that is, having better reporting than the average as indicated by the fatality rates) were graded "Standard," while those States falling below the average of 100 per cent were classed as "Below standard." Equal weight was given to the fatality rates for each of the five diseases.

The following lists show the results of applying the method outlined, which is based on the fatality rates alone:

STATES RATED STANDARD

(Above the average number of cases reported for each death)

1. California.
2. Connecticut.
3. District of Columbia.
4. Illinois.
5. Kansas.
6. Maryland.
7. Massachusetts.
8. Michigan.
9. Minnesota.
10. Mississippi.
11. New Jersey.
12. New York.
13. North Carolina.
14. Ohio.
15. Oregon.
16. Pennsylvania.
17. Rhode Island.
18. South Carolina.
19. Utah.
20. Vermont.
21. Virginia.
22. Washington.
23. Wisconsin.
24. Wyoming.

STATES RATED BELOW STANDARD

(Below the average number of cases reported for each death)

1. Alabama.
2. Arizona.
3. Arkansas.
4. Colorado.
5. Delaware.
6. Florida.
7. Idaho.
8. Indiana.
9. Iowa.
10. Kentucky.
11. Louisiana.
12. Maine.
13. Missouri.
14. Nebraska.
15. New Hampshire.
16. North Dakota.
17. Oklahoma.
18. South Dakota.
19. Tennessee.
20. Texas.
21. West Virginia.

In the following-named States complete data for the three years were not available.

1. Georgia.
2. Montana.
3. Nevada.
4. New Mexico.

The computations were made on the numbers of cases and deaths for each disease as reported to the Public Health Service, but the figures for States which were near the dividing line were corrected by using the deaths as published by the Bureau of the Census.

The average number of cases for each death for the three years is as follows:

	Cases
Diphtheria	11
Measles	106
Scarlet fever	78
Typhoid fever	5
Whooping cough	26

This table is based on the aggregate number of cases as reported to the Public Health Service and the number of deaths as published by the Bureau of the Census.

The accompanying tables illustrate the method used in arriving at the percentages for each State.

Examples showing method of arriving at percentage for each State

MAINE

Disease and year	Cases reported	Deaths registered	Cases reported per death registered: Maine	Cases reported per death registered: Registration area (standard)	Per cent of standard	Average per cent for the 3 years
Diphtheria						76
1927	224	30	7.47	12.218	61	
1928	210	25	8.40	10.930	77	
1929	156	16	9.75	10.929	89	
Measles						83
1927	4,697	80	58.71	101.314	58	
1928	3,927	38	103.34	93.563	110	
1929	5,641	57	98.96	124.106	80	
Scarlet fever						104
1927	1,550	36	43.06	82.308	52	
1928	1,165	17	68.53	77.439	88	
1929	1,386	11	126.00	73.073	172	
Typhoid fever						127
1927	227	28	8.11	5.204	156	
1928	135	36	3.75	4.760	79	
1929	156	23	6.78	4.689	145	
Whooping cough						91
1927	1,584	75	21.12	24.193	87	
1928	1,290	54	23.89	25.863	92	
1929	965	38	25.39	27.052	94	
Final average of yearly averages for the 5 diseases						96

NEW YORK

Disease and year	Cases reported	Deaths registered	Cases reported per death registered: New York	Cases reported per death registered: Registration area (standard)	Per cent of standard	Average per cent for the 3 years
Diphtheria						145
1927	17,421	1,002	17.39	12.218	142	
1928	13,674	876	15.61	10.930	143	
1929	10,816	663	16.31	10.929	149	
Measles						131
1927	26,658	197	135.32	101.314	134	
1928	75,806	598	126.77	93.563	135	
1929	30,007	195	153.88	124.106	124	
Scarlet fever						144
1927	29,196	219	133.32	82.308	162	
1928	21,598	183	114.88	77.439	148	
1929	16,392	186	88.13	73.073	121	
Typhoid fever						162
1927	1,659	190	8.73	5.204	168	
1928	1,613	205	7.87	4.760	165	
1929	1,195	167	7.16	4.689	153	
Whooping cough						135
1927	16,231	510	31.83	24.193	132	
1928	19,075	595	32.06	25.863	124	
1929	16,256	403	40.34	27.052	149	
Final average of yearly averages for the 5 diseases						143

It is realized that this plan is not entirely above criticism. Many health authorities contend that fatality rates are so variable that these alone should not be used as a yardstick in measuring the prevalence of disease. There is some evidence to substantiate this view. However, the problem of improving the reporting of disease and the establishment of standards therefor is an extremely complicated matter. It appears that, at least for the present, some such plan as mentioned above is the most practicable one that can be put into effect. It has the advantage of being applicable at the present time,

it does not require additional appropriations, and it may be varied to meet changing conditions of the future.

It is unfortunate that some States that have excellent health departments and are doing good health work are not included among the States listed as attaining the required standard. Some of these States are handicapped by local conditions which make the securing of morbidity reports more difficult than it is in other States. It is believed, however, that most of the States, with some effort, can soon reach the present average standards as shown in the table presented.

The establishment of the morbidity reporting area will not supersede the reports now received, compiled, and published. The Public Health Service now receives and disseminates some morbidity information from all of the States, the District of Columbia, Porto Rico, Hawaii, Alaska, and the Philippine Islands. It is not intended that these reports shall be curtailed, but it is hoped that the reports sent out by the Public Health Service may be made more valuable to the health officers.

No provision has been made for the admission of cities in States not included in the area; but if any State health officer desires that cities of considerable size in his State be admitted with a view to encouraging the State as a whole to meet the requirements, such an arrangement can probably be made.

It is proposed that all States that qualify be admitted tentatively. If the needed data can not be supplied regularly and with reasonable promptness, such States will not be included in the area as finally determined.

The matter of whether it is desirable that this proposed morbidity reporting area be definitely established on the basis as above described or whether its establishment should further be postponed until some more feasible plan may be devised is submitted for your consideration. In the absence of a better plan, it is recommended that your approval be given for the tentative establishment of an area to which States that attain the average standard reporting of the prevalence of disease may be admitted, these standards to be increased or changed as varying conditions may determine.

(Editorial note.—The conference unanimously approved the plan here outlined for the establishment of a morbidity reporting area.—Ed.)

STUDIES ON THE BIOCHEMISTRY OF SULPHUR

XI. THE SUBSTITUTION OF DITHIOETHYLAMINE (CYSTINE AMINE) FOR CYSTINE IN THE DIET OF THE WHITE RAT

By M. X. Sullivan, *Senior Biochemist*, W. C. Hess, *Assistant Chemist*, and W. H. Sebrell, *Passed Assistant Surgeon, United States Public Health Service*

Osborne and Mendel (1915) gave evidence that the maintenance and growth of the white rat on a casein diet depended on the content

of cystine, the sulphur-containing amino acid. They obtained normal growth on an 18 per cent casein diet supplemented by protein-free milk and butterfat. On a similar diet, but with the casein reduced to 9 per cent, subnormal growth occurred. The addition of cystine without any other supplement at once rendered the ration adequate for growth. When the diet contained 4.5 per cent or even 6 per cent of casein, little growth occurred and the addition of cystine no longer sufficed to facilitate growth as vigorously as it did in the case where 9 per cent of casein was used.

Lewis (1924), and Mitchell and Hamilton (1929) review experimental work which shows that feeding cystine increases the sulphate content of the urine and that the taurine in the taurocholic acid of the bile is derived from cystine. Friedmann (1903) oxidized cystine *in vitro* to cysteic acid by bromine water and converted the cysteic acid to taurine by decarboxylation at high temperatures. Based on Friedmann's work the formation of taurine from cystine in the animal body is presumed to proceed according to the following scheme:

$$\begin{array}{cccc}
\text{cystine} \longrightarrow & \text{cysteine} \longrightarrow & \text{cysteic acid} \longrightarrow & \text{taurine} \\
CH_2S{-}SCH_2 & CH_2SH & CH_2SO_3H & CH_2SO_3H \\
| \quad\quad | & | & | & | \\
CHNH_2\ CHNH_2 & CHNH_2 & CHNH_2 & CH_2NH_2 \\
| \quad\quad | & | & | & \\
COOH\ \ COOH & COOH & COOH &
\end{array}$$

Neither inorganic sulphates (Daniels and Rich, 1918) nor elementary sulphur (Geiling, 1917) (Lewis and Lewis, 1927) can serve as a substitute for cystine in the diet of white mice and rats. M. L. Mitchell (1924), on the other hand, published observations which indicate that taurine can replace cystine in the diet of mice. His results, however, have not been confirmed by later investigators. Thus Beard (1925–26) and Rose and Huddlestun (1926) found taurine of little value as a substitute for cystine in the diet of mice and rats, respectively. Lewis and Lewis (1926) concluded further that neither taurine nor cysteic acid can replace cystine even in part for the purposes of growth of the white rat. Later, Westerman and Rose (1927) concluded that neither dithioglycollic acid $\begin{array}{c} CH_2S{-}SCH_2 \\ | \quad\quad | \\ COOH\ \ COOH \end{array}$ nor β-dithiodipropionic acid $\begin{array}{c} CH_2S{-}SCH_2 \\ | \quad\quad | \\ CH_2 \quad CH_2 \\ | \quad\quad | \\ COOH\ \ COOH \end{array}$ can serve as a substitute for cystine in the diet of the white rat.

As far as can be ascertained no one has ever tested the amine $\begin{array}{c} CH_2S - SCH_2 \\ | \quad\quad | \\ CH_2NH_2\ CH_2NH_2 \end{array}$ as a substitute for cystine in the dietary of rats. This amine was made on a small scale by Neuberg and Ascher (1907) by decarboxylation of cystine by heat and was called amino-ethyl disulphide. Gabriel (1891) synthesized it and named it dithioethylamine.

To point out its close connection with cystine and to distinguish it from CH_2SH corresponding to cysteine, Sullivan and Hess (1929)

$$\begin{array}{l} CH_2SH \\ | \\ CH_2NH_2 \end{array}$$

gave it the short name cystine amine.

In view of the relationship of this amine to cystine and its behavior in the Sullivan cystine reaction (Sullivan and Hess, 1929) feeding experiments were started to determine whether or not this sulphur-containing amine can be substituted for cystine in the dietary of the white rat. These experiments give evidence that the so-called cystine amine, employed as the hydrochloride, can replace cystine to a considerable degree for the purpose of growth of the young white rat.

EXPERIMENTAL

Feeding experiments with cystine and cystine amine.—Young male white rats 27 to 31 days old and weighing approximately 55 grams were selected as the experimental animals. All the rats were from the same stock colony bred at the National Institute of Health for nutrition studies. All the young rats used were from mothers on the standard régime recommended by McCollum to Evans and Bishop (1922) and used by them in breeding experiments. The only modification in our work was the use of lettuce as an aid to reproduction. The constitution of the standard diet is given in Table 1.

TABLE 1.—*Stock diet*

Ingredient	Grams
Whole wheat flour	67.5
Commercial casein	15.0
Whole milk powder	10.0
Butter fat	5.0
Calcium carbonate	1.5
Sodium chloride	1.0
	100.0

Lettuce daily ad lib.

For the work detailed in this paper a basal diet which gave a slight growth was first established. This was obtained by starting with a diet comparable to diet 313T (Table 2) with 9 per cent casein and 77 per cent cornstarch. At a level of 9 per cent casein, rapid growth occurred. A 6 per cent casein diet (313T) also gave good growth. At the 4 per cent casein level (diet 349), slow growth occurred. Accordingly, diet 349 (Table 2) was made use of as a basal ration. To obtain data as to the relative value of cystine and cystine amine supplements, 0.5 gram of cystine and 0.5 gram of cystine amine dihydrochloride approximately molar equivalents were substituted for a corresponding amount of cornstarch as given in diets 349A and 364, Table 2.

TABLE 2.—*Diets employed in feeding experiments on the comparative value of cystine and cystine amine*

Ingredient	Diet 313T	Diet 349	Diet 349A	Diet 364
	Gm.	*Gm*	*Gm.*	*Gm.*
Casein leached	6.0	4.0	4.0	4.0
Salt mixture (O. and M.)	4 0	4 0	4.0	4.0
Cod-liver oil	2.0	2.0	2.0	2.0
Cottonseed oil	3.0	3.0	3.0	3.0
Brewers' yeast (dried)	5.0	5 0	5.0	5.0
Cornstarch	80.0	82.0	81.5	81.5
Cystine			.5	
Cystine amine dihydrochloride				.5

The casein used had been leached with 2 per cent acetic acid as recommended by McCollum (1922). It was then dried in a current of hot air at about 120° C. The salt mixture was that of Osborne and Mendel (1919). The cod-liver oil was a Norwegian oil. The brewers' yeast was a dried commercial sample which had been found effective in aiding growth and preventing polyneuritis when added at a 5 per cent level. The cystine had a rotation of $[\alpha]_D^{20}-213.1$ determined on a 1 per cent solution in N hydrochloric acid. The cystine amine hydrochloride was made by the Gabriel (1891) synthesis as detailed by Sullivan and Hess (1929). The feeding experiments were conducted concomitantly on litter mates in the case of the basal diet and the basal diet plus cystine, with four rats on each diet. The cystine amine experiment was carried on later with a different set of litter mates. Each rat was in an individual cage. Each diet was eaten readily.

DIFFERENCES IN THE GROSS APPEARANCE OF THE RATS ON THE THREE DIETS

Basal.—The rats on the basal diet kept the soft, downy hair of baby rats to the end of the experiment, 20 weeks. There was in the interval more or less depilation of the abdomen, the medial surface of the thighs, and parts of the scrotum.

Basal plus cystine.—The hair of the rats on this diet was normal adult hair in excellent condition at the end of the experiment. There was little if any depilation during the feeding period.

Basal plus cystine amine.—The hair remained infantile for a number of weeks but finally appeared as normal adult hair. There was little if any depilation during the feeding period.

Though differing somewhat in size, all the rats were in excellent condition throughout the experiment.

As measured by gain in weight the results of the feeding experiments are shown in Table 3 and Charts 1, 2, and 3.

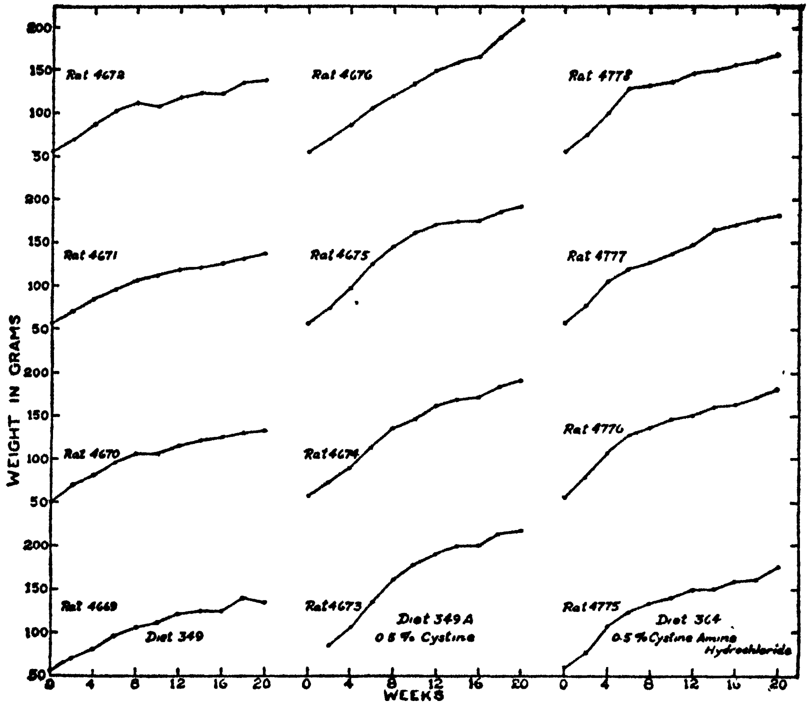

CHART 1.—Individual weight curves of the rats on each of the three experimental diets

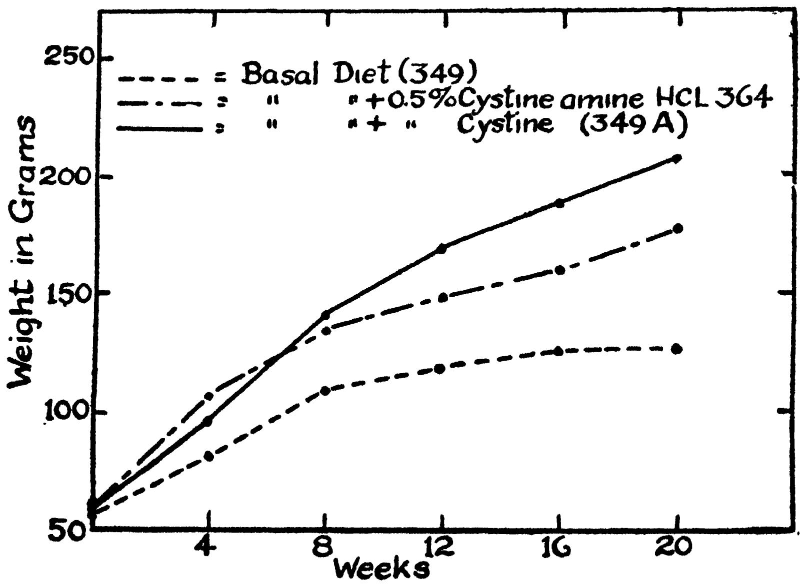

CHART 2.—Composite weight curves of the four rats on each of the three experimental diets

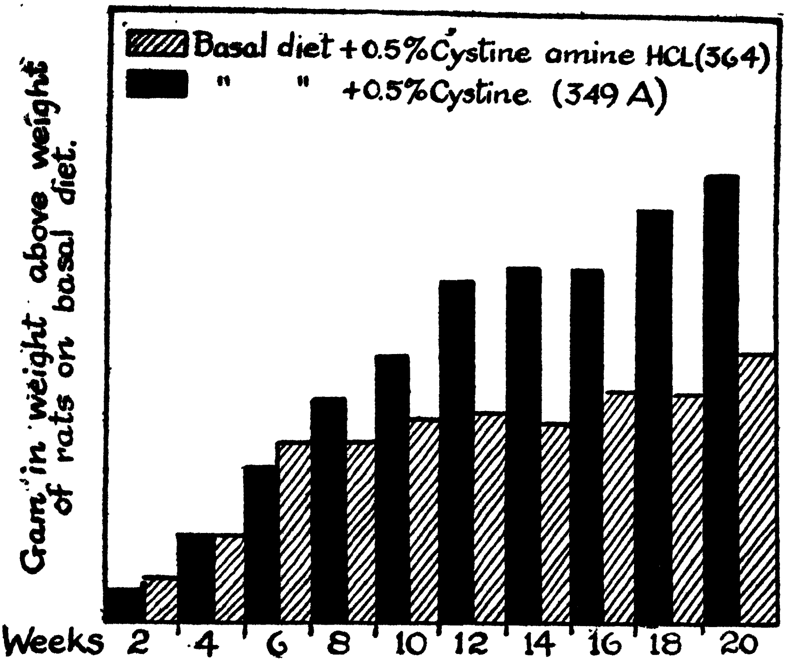

CHART 3.—Gain in weight of the rats receiving cystine and cystine amine, respectively, over the weight of the rats on the basal diet, at two-week intervals

TABLE 3.—*Summary of feeding experiments*

LITTER A548

Rat No.	Duration, weeks	Diet	Initial weight	Final weight	Gain
			Gm.	*Gm.*	*Gm.*
4669	20	Basal (349)	56	135	79
4670			55	133	78
4671			56	137	81
4672			56	139	83
Average			55.75	136	80.25

LITTER A548

Rat No.	Duration, weeks	Diet	Initial weight	Final weight	Gain
4673	20	Basal + cystine (349A)	60	217	157
4674			56	189	133
4675			56	190	134
4676			55	209	154
Average			56.75	201.25	144.5

LITTER A593

Rat No.	Duration, weeks	Diet	Initial weight	Final weight	Gain
4775	20	Basal + cystine amine (364)	58	177	119
4776			57	184	127
4777			58	182	124
4778			56	172	116
Average			57.25	178.75	121.5

Charts 1, 2, and 3 and Table 3 show that both cystine and cystine amine give increased growth of the rats over that given by the basal diet. The increase over that on the basal diet given by cystine in 20 weeks' feeding is 64.25 grams (average of 4 rats); by cystine amine 41.25 grams (average of 4 rats). Accordingly, 64.2 per cent of the weight increase obtained by adding cystine at a 0.5 per cent level to the basal diet is given by the cystine amine dehydro-chloride at the same level.

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EXPERIMENTAL STUDIES OF NATURAL PURIFICATION IN POLLUTED WATERS

VI. RATE OF DISAPPEARANCE OF OXYGEN IN SLUDGE[1]

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The experiments to be presented in this paper were undertaken in January, 1929, and, with few interruptions, were continued for almost a year. The purpose of the experiments was to discover a possible reason for the remarkably high rate of purification observed when grossly polluted water is passed through a system of artificial channels located on the grounds of the stream-pollution laboratory in Cincinnati, Ohio.

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[1] Presented under the subtitle before the Division of Water, Sewage, and Sanitation at the Eightieth meeting of the American Chemical Society, Cincinnati, Ohio, Sept. 8–12, 1930, and published in *Industrial and Engineering Chemistry*, **22**, 1330–1336 (1930).

These channels may be described as a series of shallow troughs, about 1 mile long, through which polluted water may be passed at a uniform rate. Under ordinary conditions of operation a heavy mat of sludge soon forms on the small stones or pebbles with which the bottom of the troughs is lined. In this respect the artificial channels simulate a very small stream, although, more properly they may be likened to a trickling filter, the disposition of the filter bed being horizontal instead of vertical. Excepting the facility with which reaeration is accomplished, there is also some resemblance between these channels and the system of treatment based on the use of underground tile drains. The general arrangement of the channels is such that all parts are readily accessible for sampling, so that the system is well adapted to observations of the sequence of changes which occur in natural purification. Our present interest, however, will be centered on a study of the rates of purification between selected points under controlled conditions.

Now it is reasonably well established that the deoxygenation of polluted water from a variety of sources and under widely different experimental conditions may be formulated in terms of a unimolecular reaction, it being understood that this is simply a convenient method of representing the data, and not an expression of opinion regarding the probable nature of the reaction. Other formulas might be used, although in the selection of a formula it is of consequence that the two constants in the unimolecular equation are intimately related to the problems peculiar to deoxygenation studies. Thus the velocity constant is a measure of the amount of material transformed in unit time when a unit amount of material is present. The total demand, at best an extrapolated figure, may likewise be identified with the limiting value which the observations are tending to reach. These mathematical properties are not possessed, for example, by the constants in formulas of the adsorption type. Whenever possible, therefore, we have sought to formulate our oxygen-demand results in terms of the unimolecular formula.

As to the magnitude of the deoxygenation constant, numerous observations indicate that, for river water, a value of about 0.1 at 20° C. may be accepted as a close approximation when the time is expressed in days and common logarithms are used. The somewhat higher values reported for sewage by some observers are subject to correction for "immediate" oxygen-demand effects. A velocity constant of this order of magnitude implies that 99 per cent of the first-stage oxygen demand will be satisfied in 20 days or, on the same scale, 90 per cent in 10 days. This corresponds, of course, to an exceedingly slow reaction. In the channels, on the other hand, it has been repeatedly observed that a reduction of 90 per cent in the first-stage demand may occur in a period of flow of about 20 minutes. If this purification

is ascribed to oxidation according to a unimolecular formula, the velocity constant would be 3 × 24 × 10 = 720, a figure which is seven thousand two hundred times as great as the normal rate of deoxygenation in river water. Velocity constants of the same order of magnitude may be deduced from the over-all rates of purification observed in activated-sludge tanks, in trickling filters, and in other oxidizing devices. In each case the apparent velocity constant approaches that of ordinary chemical reactions.

The problem, therefore, was to discover the reason for this greatly accelerated rate of purification. In particular, it has appeared of considerably practical importance to ascertain whether these over-all rates of purification were accompanied by a corresponding degree of oxidation or were simply, as might be suspected, a result of rapid adsorption by the sludge. Enzymatic action, which we may tentatively identify with the so-called "immediate" oxygen-demand phenomenon, is also to be considered. In any event it is certain that these exceptional rates of purification are invariably associated with the presence of aerated sludge. Our studies were accordingly directed toward the evaluation of rates of oxidation in the presence of channel sludge. In view of the kinship, or even the actual identity, of aerated sludge from various sources, the methods used in this study, if not the findings themselves, may probably be adapted to studies of other oxidizing devices.

APPARATUS

The procedure used in these experiments was developed for the determination of the oxygen demand of sludges and similar materials of high oxygen-absorbing power, without resort to dilution. It consists, essentially, in the incubation of the sample in a partly filled bottle provided with stopcocks for the removal of suitable portions of the inclosed air and of the polluted liquid for examination. Continued aeration of the sample is secured by the recirculation of the air in a closed system.

The general arrangement of the aerating device is shown in Figure 1. An alternating motion is imparted to the mercury in the U tube by a plunger connected to a small fan motor. On the upstroke the lower valve, *C*, acts as a seal and air is drawn through the valve *V*. On the downstroke the valve *V* closes and bubbles of air are distributed throughout the liquid. This aerator is readily constructed from ordinary laboratory materials without expert glass blowing.

The assembled apparatus, without the aerator, is shown in Figure 2. In work with sludge the sampler for liquids shown at the left of the apparatus may be dispensed with as the dissolved-oxygen content of the sludge is generally negligible in relation to its total demand. The gas-sampling pipet shown at the right is water-jacketed and it

is calibrated for the withdrawal of 10-c. c. samples of air. At the start of a test the U-shaped gas-absorption vessel shown at the extreme right of Figure 2 is filled with water of known oxygen content. The gas sample is then transferred to the absorption vessel, thereby displacing some of the water through the open limb of the vessel. Prior to inserting the stopper, 1 ml. each of the regular Winkler

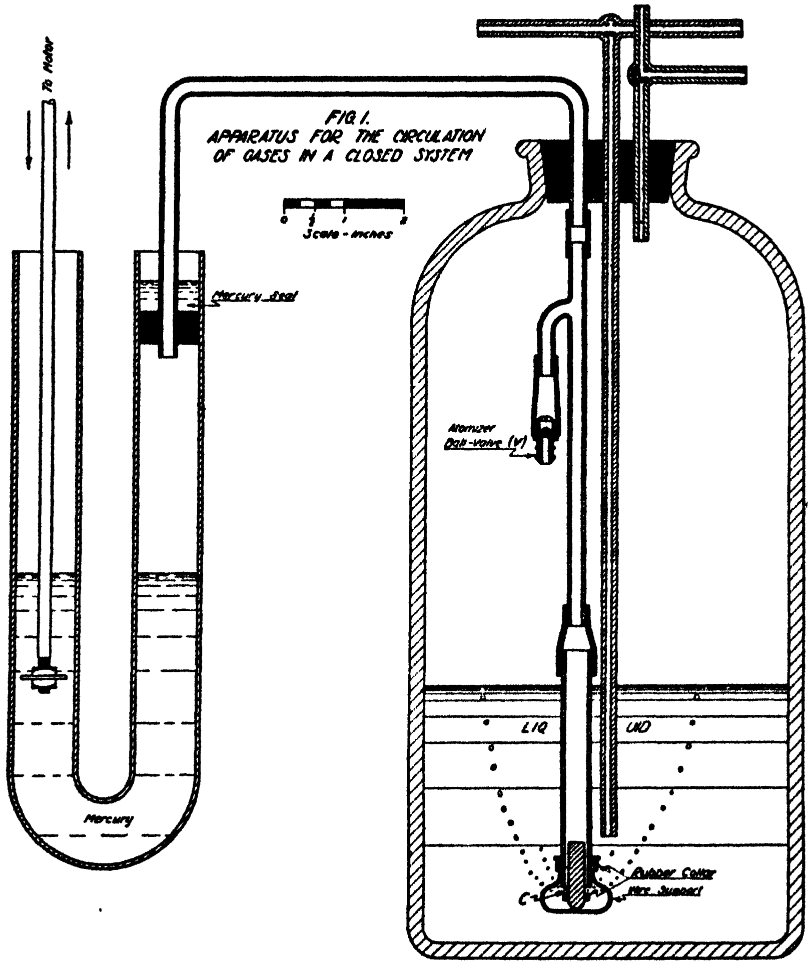

FIGURE 1.—Apparatus for the circulation of gases in a closed system

reagents is added with the usual precautions. Complete absorption of the gaseous oxygen by the manganous hydroxide is secured by agitating the air-water mixture, mechanically or other wise, for 10 minutes. The determination then follows along the usual lines. Corrections for variations of temperature and barometric pressure are avoided, as the results are obtained directly in milligrams. Ordinary air is used for reaeration, instead of pure oxygen, and an air-water

interface is maintained at all times. When 3-liter bottles containing 1 liter of sample are used, the precision of the method is within 5 mg. of oxygen.

The reader is referred to Theriault and Butterfield (1929) for a more extended discussion of the technic of oxygen-demand tests.

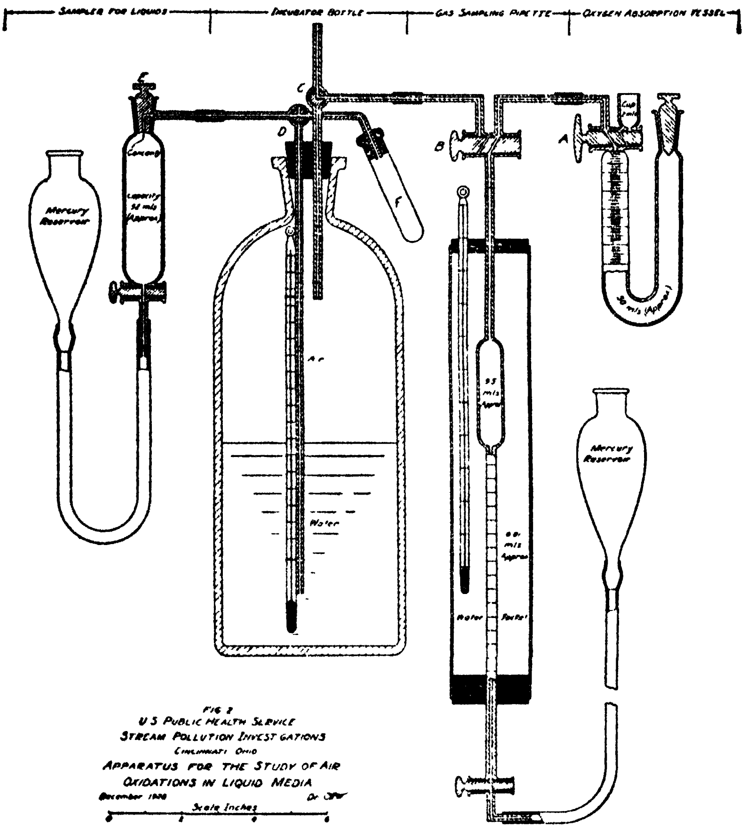

FIGURE 2 —Apparatus for the study of air oxidations in liquid media

RESULTS

The results obtained in a typical experiment (Series 10, February, 1929) with sludge from the artificial channels are presented in the fifth column of Table 1 and in the upper curve of Figure 3. The sludge used in this experiment contained around 12,000 p. p. m. of suspended matter and 23 per cent of settlable solids by volume in 30 minutes of settling. The pH value of the sludge liquor at the start of the experiment was 7.2.

Superficially, the upper curve shown in Figure 3 bears a close resemblance to the deoxygenation curves obtained with river water,

although the entire curve can not be fitted, even with a fair degree of accuracy, by the usual unimolecular formula, $Y = L\ (1-10^{-kt})$. Beyond the first day, however, equations of this type do hold with remarkable accuracy, the deoxygenation constant, k, being of the same order of magnitude as that obtained with river waters.

The failure of the unimolecular formula to represent the results during the first day is to be credited to the purely chemical or enzy-

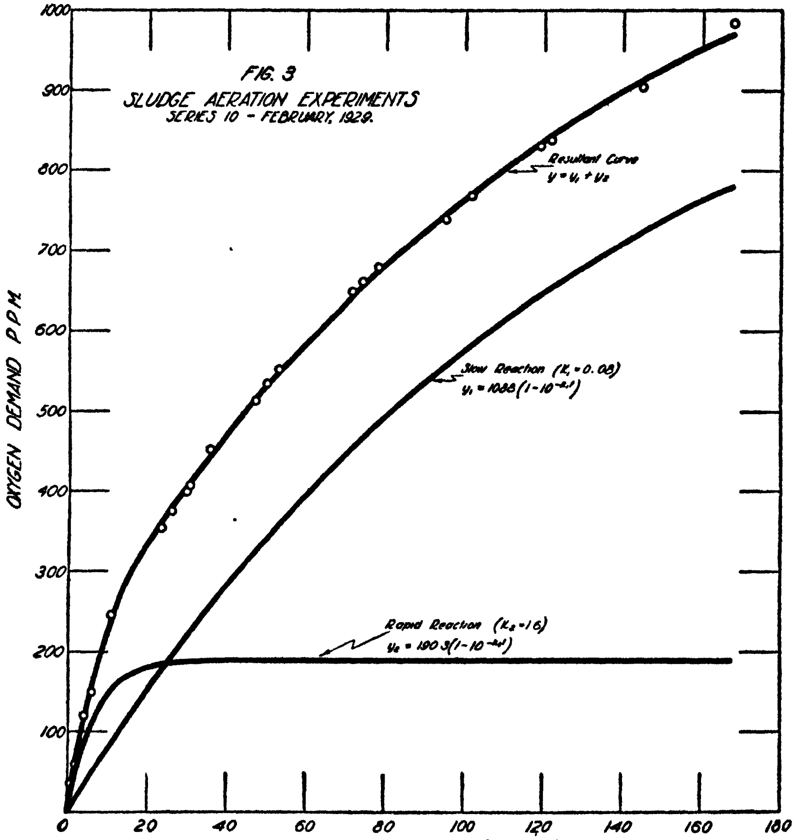

FIGURE 3.—Sludge aeration experiments. Series 10; February, 1929

matic effect generally designated as the "immediate" oxygen demand of the sludge. With stale sewage the immediate demand has been ascribed to the presence of hydrogen sulphide and other materials readily oxidizable by dissolved oxygen without biological intervention. For lack of a better expression, the term "immediate demand" will be used in this paper to describe the relatively rapid reaction in question, although, as will presently appear, this purely chemical or enzymatic reaction is by no means instantaneous.

On the basis of an extended mathematical analysis of such data it may be assumed that the immediate demand itself is satisfied according to a unimolecular formula, the deoxygenation constant being relatively large. The oxidation of sludge by atmospheric oxygen may therefore be represented as the sum of two unimolecular expressions, $Y=L_1(1-10^{-k_1t})+L_2(1-10^{-k_2t})$ where Y is the observed oxygen demand over the time t. The constants L_1 and L_2 refer, respectively, to the oxygen demand arising from the first stage of biological oxidation and from the immediate demand. The corresponding velocity constants are represented by the symbols k_1 and k_2.

The evaluation of the four constants in the sludge-deoxygenation curve offers certain mathematical difficulties which will be discussed in detail elsewhere. As a first approximation a curve might be fitted to results obtained beyond the first day. This curve could then be extended to the start of the experiment and used as a basis of correction in obtaining the immediate demand over given periods of incubation. The velocity constant of the initial reaction could then be derived from these corrected values. Actually a least-squares procedure has been used which, while it is laborious, does furnish the desired information with mechanical accuracy.

For the data in question the velocity constant which describes the rate of satisfaction of the slowest reaction was 0.08. As the experiment was conducted at a room temperature, during the day, of 18° to 22° C., this velocity constant is in substantial agreement with the river-water value of 0.10 at 20° C., or 0.09 at 18° C. For the rate of satisfaction of the immediate demand the velocity constant was around 1.6, a value sixteen to twenty times as great as the normal rate of deoxygenation under the given temperature conditions. A velocity constant of this magnitude implies that 90 per cent of the oxidation is accomplished in about 15 hours, or 60 per cent in 6 hours.

The relative magnitude of the immediate demand is also shown in Figure 3, where the calculated values for this rapid reaction are plotted together with the values for the slowest reaction. The sum of these two curves gives the resultant or upper curve shown in Figure 3, which corresponds very nearly to the actual observations (Table 1, last column). The immediate demand was 190 p. p. m. and the first stage demand was 1,088 p. p. m. Excluding nitrification, the total demand was 1,278 p. p. m. The immediate demand, accordingly, constituted about 15 per cent of the total demand. As a result approximately 35 per cent of the primary oxygen requirement was satisfied during the first day instead of 20 per cent, as observed with river water at the same temperature. It is clear that these relationships could not be deduced by a consideration of results obtained during the first few hours of aeration. In fact, when the sludge is recirculated, the actual period of aeration is to be measured in days, or even weeks, rather than in hours.

It will be noted that the plot of the observations shown in Figure 3 is a very smooth curve which gives no indication of any change of inflection when the immediate demand is satisfied. To confirm this result the experiment was repeated several times with more frequent observations during the first 24 hours. The results plotted in Figure 4 (series 19, May, 1929) represent half-hourly observations over a 12-hour period, using a sludge which contained about 10,000 p. p. m. of suspended matter. For the first four or five hours the course of the deoxygenation could very well be represented by a straight line

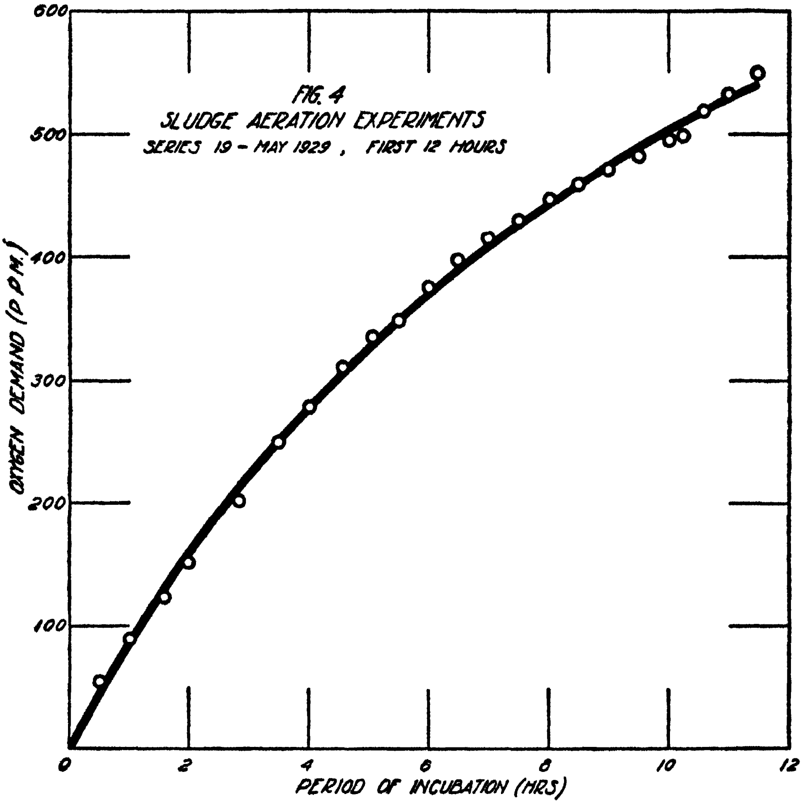

FIGURE 4.—Sludge aeration experiments. Series 19; May, 1929. First 12 hours

(*cf.* Grant, Hurwitz, and Mohlman, 1930). Thereafter the characteristics of the deoxygenation curve become unmistakable. A still higher degree of experimental precision would be required before using such slight changes of inflection as occur, for instance, at the ninth hour, as a basis of differentiation between purely chemical effects or air oxidations in the usual sense and other possible effects due to enzymatic action. Likewise the complete deoxygenation curve, as shown in Figure 5 with change of scale, does not admit of separation into distinct stages by a simple inspection of the plot.

As before, the line drawn through the observations in Figure 5 is the least-squares fit using the compound formula. The agreement between the observed and calculated values shown in Table 2 is within an expected experimental error of 5 or 10 p. p. m., corresponding to an error of 0.5 to 1.0 per cent with oxygen-demand values of 1,000 p. p. m. The total demand up to the nitrification stage was 1,547 p. p. m. The immediate demand was 368 p. p. m., or 24 per

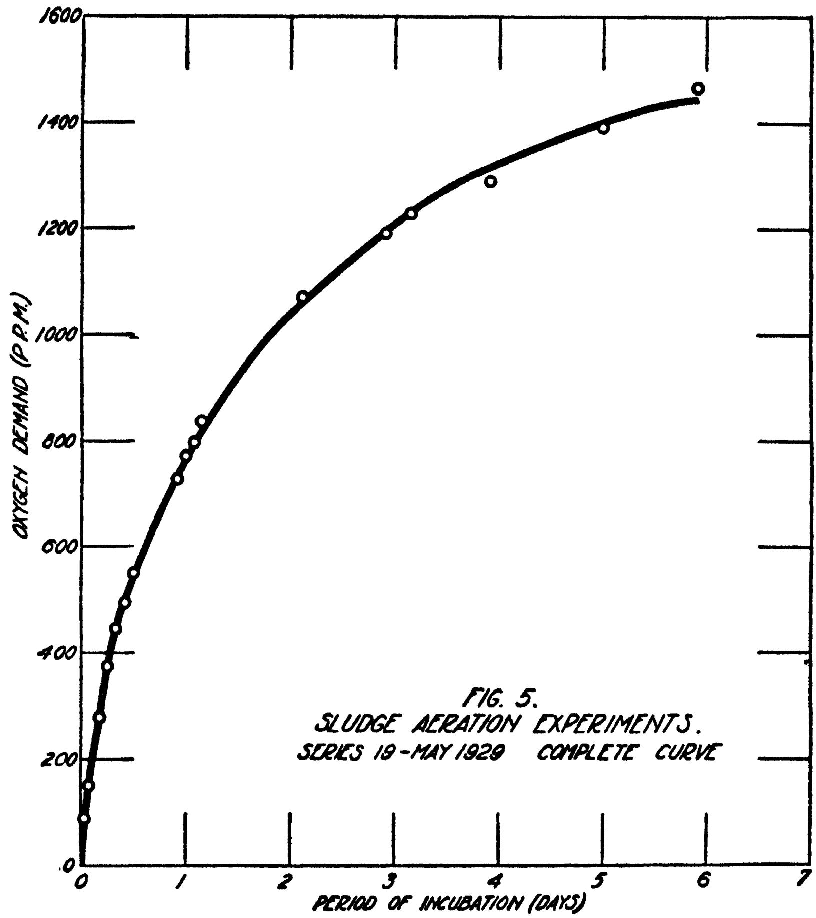

FIGURE 5.—Sludge aeration experiments. Series 19, May, 1929. Complete curve

cent of the total. The temperature in this experiment ranged from 26° to 32° C. The deoxygenation constant for the slowest reaction ($k_1=0.18$) is appreciably higher than the value found for sludge at 18° to 22° C. The order of magnitude of this velocity constant is the same as that of the corresponding constant for river water in the given range of temperatures. For the immediate demand reaction the rate of deoxygenation ($k_2=2.0$) also appears higher than in the first experiment at a lower temperature.

Experiments conducted under carefully controlled temperature conditions have indicated that, for the relatively rapid reaction at least, the derivation of a temperature coefficient would be hazardous without a consideration of other factors, notably the pH value of the medium and the degree of staleness of the sludge. As the question of variations in the deoxygenation constants is of obvious importance to the study of comparative rates of purification, the influence of various modifying factors will now be briefly discussed.

TABLE 1.—*Oxygen demand of sludge, series 10, February, 1929*

Incubation period (hours)	Oxygen demand (p. p m.)				
	Immediate [1] Y_2'	First-stage [2] Y_1'	Calculated $Y'=Y_1'+Y_2'$	Observed Y	Difference $Y'-Y$
1	26	8	34	35	−1
2	49	16	65	59	6
4	86	32	118	120	−2
6	113	48	161	150	11
11	154	87	241	246	−5
23. 5	185	177	362	356	6
26	186	194	380	376	4
29 5	188	217	405	399	6
30. 5	188	223	411	407	4
35. 5	189	255	444	453	−9
47	190	325	515	513	2
50	190	342	532	534	−2
53	190	358	548	552	−4
71. 5	190	453	643	649	−6
74	190	465	655	663	−8
78	190	484	674	679	−5
95	190	556	746	740	6
101. 5	190	582	772	769	3
119	190	644	834	832	2
122	190	654	844	838	6
145	190	723	913	904	9
168	190	781	971	984	−13

[1] $Y_2'=190.3\ (1-10^{-k_2t})$, where $k_2=0.003271$ when t is expressed in hours.
[2] $Y_1'=1088\ 2\ (1-10^{-k_1t})$, where $k_1=0.06505$ when t is expressed in hours. When the time is expressed in days, the rounded values of k_1 and k_2 are 0 08 and 1.6, respectively.

TABLE 2.—*Oxygen demand of sludge, series 19, May, 1929*

Incubation period (hours)	Oxygen demand (p. p. m.)		Incubation period (hours)	Oxygen demand (p p. m.)		Incubation period (hours)	Oxygen demand (p. p. m.)	
	Observed Y	Calculated [1] Y'		Observed Y	Calculated [1] Y'		Observed Y	Calculated [1] Y'
0. 50	54	44	6. 50	397	390	11. 5	550	542
1. 00	89	85	7. 00	415	408	22. 0	731	737
1. 58	123	129	7. 50	430	426	24. 0	772	766
2. 00	152	159	8. 00	446	443	26. 0	797	794
2. 83	202	213	8. 50	460	459	28. 0	837	820
3. 50	249	251	9. 00	471	474	51. 0	1, 072	1, 061
4. 00	277	278	9. 50	483	489	69. 5	1, 192	1, 195
4. 55	310	305	10. 00	494	503	76. 0	1, 229	1, 232
5. 05	334	329	10. 25	498	510	94. 0	1, 291	1, 317
5. 50	349	349	10. 58	520	519	119. 5	1, 393	1, 399
6. 00	376	370	11. 00	533	529	141. 5	1, 467	1, 446

[1] $Y'=1179.72\ (1-10^{-0.0078461t})+367.59\ (1-10^{-0.084371t})$, when t is expressed in hours. The rounded values of the velocity constants are 0.18 and 2.0, respectively, when t is expressed in days.

EFFECT OF STORAGE

The effect of storing the sludge under anaerobic conditions prior to a test is illustrated by the data plotted in Figure 6 (series 33A and 34A). When stored for 5 days without access of air before aeration, the sludge evidently required much larger amounts of disolved ogygen during the first 24 hours than when it was aerated immediately after collection. Such a result would be expected in view of the known avidity of stale samples for dissolved oxygen. Attempts to correlate this increase in oxidizability with variations in the reduction potential of

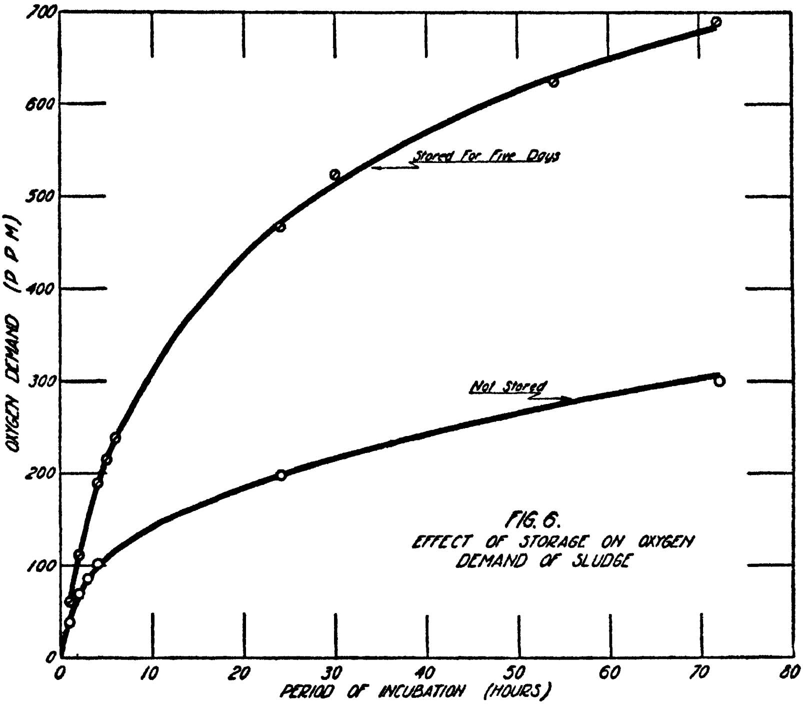

FIGURE 6.—Effect of storage on oxygen demand of sludge

the liquid have yielded inconclusive results. A repetition of these experiments with improved apparatus is in prospect.

A conclusion drawn from these and other experiments is that the immediate demand is not simply a convenient mathematical interpretation, but that it is responsive to treatments which, from known considerations, should tend to increase the putrescibility or the degree of staleness of the samples.

Despite the tremendous increase in the oxygen requirement of the stored samples, it does not appear that the specific rates of deoxygenation were materially affected when the sludge was subjected to storage prior to aeration. This is shown in Table 3, using data obtained in an experiment (series 12, March, 1929) where observations

were continued for 6 days at a room temperature of about 20° C. The velocity constants deduced by least squares are $k_1 = 0.06$ and $k_2 = 1.5$. These values do not differ significantly from those already given for relatively fresh sludge at a corresponding temperature. The agreement between the observed and the calculated values is excellent.

TABLE 3.—*Effect of storage on the specific rate of deoxygenation, Series 12, March, 1929*

Incubation periods (hours)	Oxygen demand (p. p. m.)				
	Immediate [1] Y_2'	First stage [2] Y_1'	Calculated $Y' = Y_1' + Y_2'$	Observed Y	Difference $Y' - Y$
1	52.3	6.6	59	57	2
2	97.6	13.3	111	110	1
3	136.9	19.9	157	165	−8
5	200.4	32.9	233	232	1
6	225.9	39.4	265	264	1
23	376.7	144.3	521	525	−4
29.5	385 4	181.9	567	566	1
46.5	390 6	274 0	665	670	−5
72	391.0	397.1	788	787	1
96	391.0	498.2	889	899	−10
143	391.0	661.5	1,052	1,062	−10

[1] $Y_2' = 391\ 0\ (1-10^{-k_2 t})$, where $k_2 = 0.06238$
[2] $Y_1' = 1216.0\ (1-10^{-k_1 t})$, where $k_1 = 0\ 002385$. Expressing the time in days, the rounded values of k_1 and k_2 are 0.06 and 1.5 respectively.

EFFECT OF CHANGES IN pH

The effect of variations in the pH value of the sludge liquor was studied extensively. Typical results are shown in Figures 7 and 8.

In obtaining the results plotted in Figure 7 (series 22, June, 1929) a 500-ml. portion of a given sample of sludge was diluted to 1 liter with water taken from the channels.

The oxygen demand of this diluting water was negligibly small in comparison with that of the sludge. A second 500-ml. portion of the sludge was treated with 10 ml. of Clark-Lubs phosphate solution buffered at pH 7.2 and then diluted to 1 liter with water from the channels. A third 500-ml. portion was treated with 10 ml. of 16 M NaOH to obtain a pH value of 12 or 13 and then made up to 1 liter as before.

At the start of the experiment the pH value of the sludge portion which had simply been diluted with channel water was about 7.2. The pH value of the buffered sample was also 7.2. After 5 days of aeration at 20° C. the pH values were 4.9 and 5.3, respectively, for the unbuffered and buffered sludges. As shown by the two upper curves of Figure 7, the oxygen demand of the sludge was not greatly affected by this variation of 0.4 pH units. Neither did the presence of phosphate, as such, exert any material effect on the rate or extent of deoxygenation. The lower curve in Figure 7 represents the results

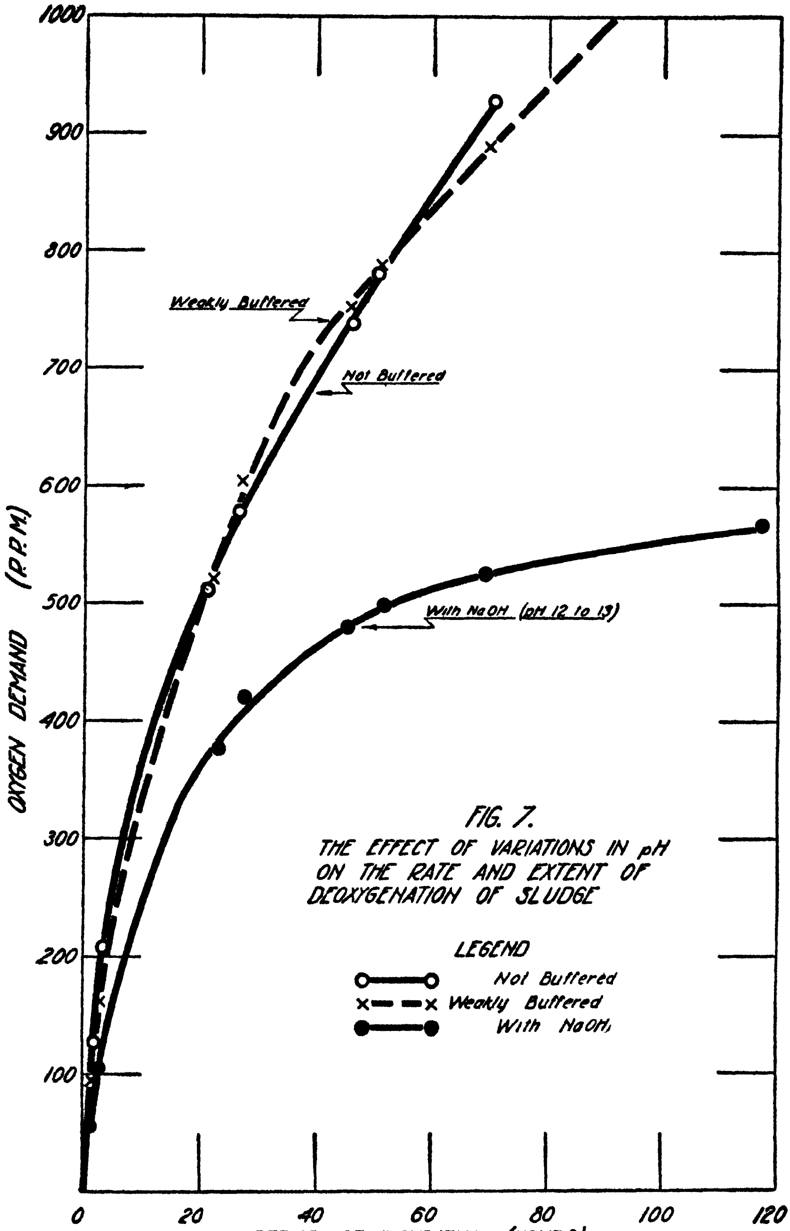

FIGURE 7.—The effect of variations in pH on the rate and extent of deoxygenation of sludge

obtained at pH values of 12 or 13. The amount of oxygen absorbed in this presumably sterile solution was surprisingly large.

In Figure 8 (series 26, July, 1929) the middle curve represents the results obtained when an 800-ml. portion of sludge was diluted to 1 liter with channel water, without addition of phosphate. The upper curve is a plot of results obtained with 800 ml. of the same sample of sludge made up to 1 liter with 100 ml. of channel water and 100 ml. of Clark-Lubs phosphate solution buffered at pH 7.2. The lower curve

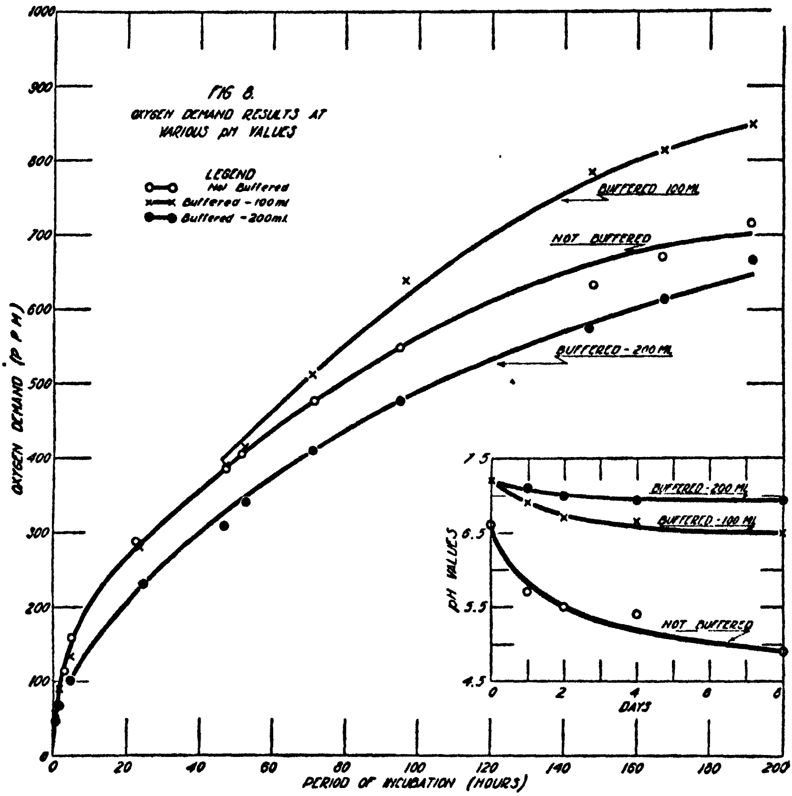

FIGURE 8.—Oxygen demand results at various pH values

gives the corresponding values when an 800 ml. portion of sludge was made up to 1 liter with 200 ml. of phosphate solution. The insert in Figure 8 gives the actual pH values at various periods of incubation.

The pH value of the unbuffered sample was 6.6 at the start of the experiment. It decreased to 5.5 after two days and to 4.9 after eight days, when the experiment was discontinued.

The pH value of the buffered samples was 7.2 in each case at the start. In the sample containing 200 ml. of buffer solution this value decreased slowly to 6.93 after eight days of incubation. With a smaller amount of phosphate solution the limiting pH value was about

6.5, a value approximating that of the unbuffered sample at the start of the experiment.

There is no indication that the presence of phosphate solution exerted any influence on the rate or extent of deoxygenation during the first two days. The higher results obtained beyond the second day with the sample containing only 100 ml. of phosphate solution may be credited either to a fortuitous adjustment of the pH value to an optimum for the particular sludge in question or else to the unfavorable effect of large amounts of phosphate.

The relatively low oxygen-demand values obtained with the unbuffered sample are probably due to the inhibitory effect of high acidity on bacterial growth.

EFFECT OF DILUTION

The effect of dilution on the specific rate of deoxygenation is illustrated in Figure 9 (series 25, July, 1929), where results with different dilutions of the same sludge have been plotted. The line drawn through the observations represents the oxygen demand at given time intervals of a mixture containing 500 ml. of sludge and 500 ml. of distilled water. In order to place the results with different concentrations of sludge on a comparable basis, the 2-day oxygen demand of this 50 per cent mixture was assigned an arbitrary value of 100. The other values plotted in Figure 9 correspond to the relative oxygen-demand values, respectively, of the undiluted sludge and of a mixture containing 25 per cent of the sludge in distilled water. For the first 72 hours the agreement between the different concentrations is very good, although there is a slight tendency for the lower concentrations to give relatively high results. Beyond the third day this tendency becomes unmistakable.

The pH value of the sludge mixtures at the start of the experiment was around 7 in each case. After 6 days of incubation the pH values with 25, 50, and 100 per cent of sludge had decreased, respectively, to 5.3, 5.0, and 4.8. On the basis of previous experiments it appears reasonable to correlate this trend in the oxygen-demand values with the progressive change in acidity and to ascribe the resulting discrepancy to inhibitory effects. In any event, it may be concluded that dilution within a fourfold range is without material effect on the specific rate of satisfaction of the immediate demand.

DISCUSSION

Despite the frequent use of the term in published reports, the writers are unaware of any previous attempts to give numerical expression to the rate of satisfaction of the "immediate" demand. As already explained, their interest in the derivation of such values was in the possibility offered of accounting for the exceptionally high

rates of purification observed in the artificial channels. From the foregoing experiments it must be concluded that the rate of satisfaction of the immediate demand, although it is relatively high, does not even approach the observed rate of disappearance of the organic matter under channel conditions. This conclusion is sustained in numerous experiments where such modifying factors as the pH value of the medium, the age of the sample, and the concentration of sludge have been widely varied.

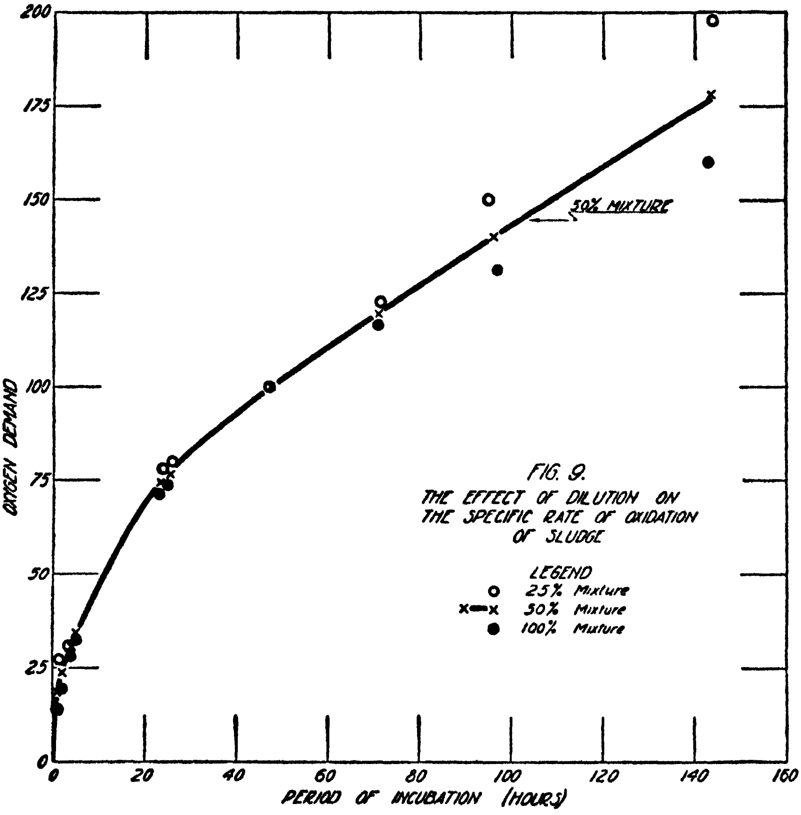

FIGURE 9.—The effect of dilution on the specific rate of oxidation of sludge

In all probability the rapid diminution of the organic matters in the supernatant liquor which is observed when sewage and aerated sludge are brought together is due to rapid adsorption by the sludge, and not to oxidation. Experiments which have a direct bearing on this point will now be briefly discussed.

RATE OF ADSORPTION OF ORGANIC MATTER BY AERATED SLUDGE

Complete deoxygenation curves are given in Figure 10 (series 32, November, 1929) for a sample of raw sewage and for the resulting supernatant liquor after treatment with sludge for a period of only 10

minutes. The raw sewage shows a 5-day oxygen demand of 135 p. p. m. and the corresponding value for the supernatant liquor is only 47 p. p. m. The apparent degree of purification accomplished, if 5-day observations only were available, would be around 65 per cent. A reduction of the same order of magnitude has recently been reported by Grant, Hurwitz, and Mohlman (1930). Actually the percentage reduction of the carbonaceous matter was considerably higher than 68 per cent, as an appreciable part of the 5-day oxygen demand of the supernatant liquor is due to nitrification. As indicated

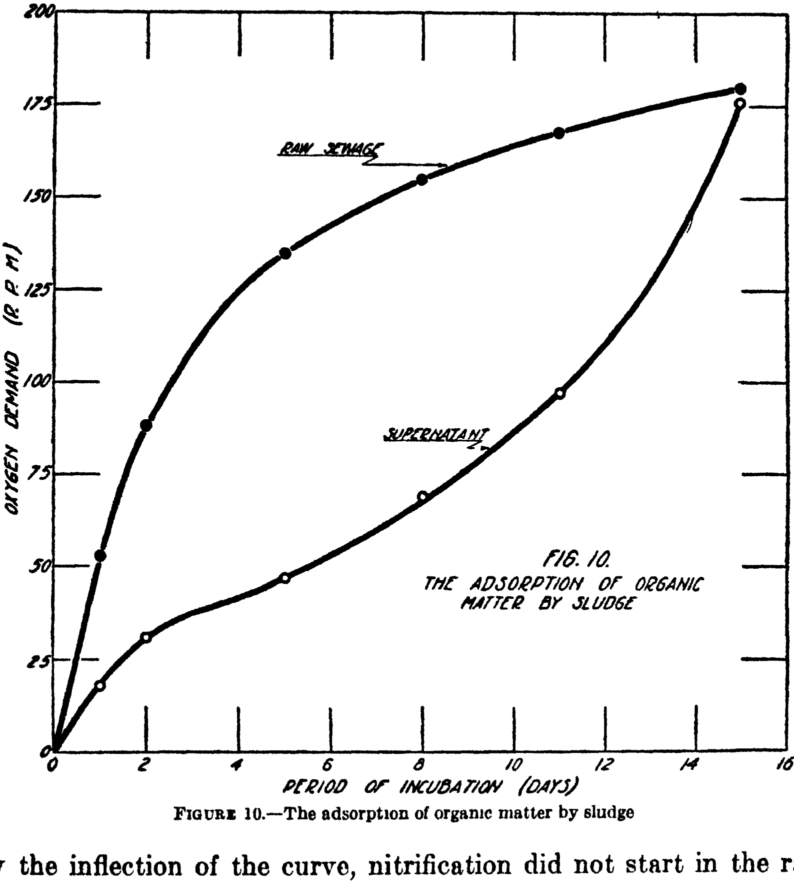

FIGURE 10.—The adsorption of organic matter by sludge

by the inflection of the curve, nitrification did not start in the raw sewage until after the tenth day.

In passing it may be remarked that no purification would be indicated if the comparison were to be based on the 15-day results. The difficulty in question has been discussed elsewhere (*cf.* Theriault, 1927, p. 146). It is only under special conditions that the oxygen-demand results obtained over arbitrarily selected periods of incubation can be applied with any degree of confidence to the estimation of the percentage removal of organic matter effected by sewage-treatment devices.

CORRESPONDENCE BETWEEN OBSERVED AND EXPERIMENTAL RATES OF PURIFICATION

A close correspondence between the rates of purification found under laboratory conditions and the rates observed in the channels themselves should be indicated if the suggested interpretation of results is valid. In an experiment designed to test these conclusions the artificial channels were first cleaned of all accumulated sludge. A heavily polluted water was then passed through at a fairly uniform rate and daily observations were made of the reduction in the first-stage demand between two selected points. Over a 21-day period it was found that 1,282 grams of oxygen would have been required to balance the apparent reduction in oxygen demand between the selected points.

Now let it be assumed that this organic matter was removed at a uniform rate by the deposited sludge and then oxidized in accordance with the sludge oxidation curve. At the end of the 21-day run the age of this deposited or adsorbed material would evidently have varied from 0 to 21 days. The average condition of this material as regards oxidation should be defined in terms of the mean value of the function which describes the oxidation of sludge.

The average temperature of the water in the channels for the 21-day period in question (August, 1929) was 28° C. At this temperature the value of k_1 deduced from extended experiments with river water (*cf*, Theriault, 1927, p. 141) is 0.14. For the present computation the value of k_2 is not critical and, with sufficient accuracy, use may be made of the figure of 2 derived in Table 2 from data which were obtained at neighboring temperatures. On the basis of numerous experiments it also appears that the immediate demand of aerated or fresh sludge constitutes about 20 per cent of the total demand during the first stage. Corrections for nitrification are unnecessary, as the oxidation did not extend to that stage in the portion of the channels selected for the experiment. The calculation leads to the conclusion that 88 per cent of the 1,282-gram requirement should have been satisfied in the channels themselves during the 21-day period of observation. The remaining oxygen requirement of 154 grams (12 per cent of 1,282) should therefore correspond to the oxygen demand of the sludge. The value actually found by direct tests on representative samples of sludge was 168 grams. The agreement between these values is satisfactory and it would not be greatly altered by minor changes in the assumed values of the deoxygenation constants.

CONCLUSION

The general conclusion drawn is that, in the sense of actual oxidation, purification by aerated sludge under channel conditions probably does not occur at a rate materially different from that observed

under laboratory conditions at the same temperature. Although the design of the artificial channels is very favorable to studies of this type, the extension of these studies to tank treatment, as in the activated-sludge process, does not appear impossible. These experiments also suggest the possibility of striking an oxygen balance in small streams where the sludge mat is presumably responsible for the high degree of apparent biological efficiency.

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Grant, S., Hurwitz, E., and Mohlman, F. W. (1930): The oxygen requirements of the activated sludge process. Sewage Works Journal, 2, 228–44.

Theriault, E. J. (1927): The oxygen demand of polluted waters. Pub. Health Bull., No. 173, pp. 1–185.

Theriault, E. J., and Butterfield, C. T. (1929): Experimental studies of natural purification in polluted waters. I. Apparatus and technique for the study of biochemical and other oxidations in liquids. Pub. Health Rep., 44, 2253–67. (Reprint No. 1317.)

POISONING FROM SILVER POLISH

Recent investigation of the circumstances surrounding cases of suspected food poisoning in which the members of two families were seized with vomiting, diarrhea, and extreme prostration after attending luncheons at a country club, showed that a polish used on the silverware was responsible. This polish was found to contain hydrocyanic or prussic acid salts. Although the package was properly labeled as a poison, with full directions as to the necessity for adequate rinsing, it appeared that in these cases the rinsing had not been throough enough to remove all traces of the poison. The cases were investigated by the Westchester County (New York) Health Department and the conclusions concurred in by the New York State Health Department.

This incident recalls numerous cases of poisoning in the past from the same cause. The following is quoted from an article appearing in Westchester's Health for April 20, 1931:

In 1928 it was reported to the State department of health that some 30 persons attending a convention dinner at a leading up-State hotel had become acutely ill several hours following the meal. Food poisoning was suspected. It was determined, however, that the silver dip used regularly, which was unquestionably responsible for the occurrence, contained over 20 per cent of cyanide of sodium. A similar outbreak was traced to the same product in another large up-State hotel shortly afterwards. * * * The elimination of silver polish from the hotels mentioned, as well as a number of others not only in this State but elsewhere throughout the country, has always promptly ended the occurrence of suspected food poisoning.

In 1928 the New York State Department of Agriculture and Markets, after analysis of the silver polish in question in conjunction with the State board of pharmacy, compelled a poison label to be placed on silver polishes sold in New

York State. In 1929 * * * the Public Health Council of the State of New York amended the Sanitary Code and added thereto the following regulation which has been in effect since December of that year:

"Any polish or article or substance containing any cyanide preparation or other poison shall not be used in any hotel, club, restaurant, or public eating place for cleansing of nickel, copper, silverware, or silver-plated ware or other articles or utensils used for the service or preparation of food or foodstuffs."

The health department of the city of New York took the same action.

COURT DECISION RELATING TO PUBLIC HEALTH

Member of New York City Board of Health held to have vacated his office because holding other offices under city government.—(New York Supreme Court, Appellate Division; Metzger *v.* Swift et al., 248 N. Y. S. 300; decided Feb. 13, 1931.) The defendant was appointed as a member of the board of health in the department of health of the city of New York. He qualified under the appointment by taking the oath of office, held the said office, and received compensation from the city. At the time of his appointment to such board, the defendant was (1) a member of the board of trustees of Hunter College of the city of New York, (2) a member of the board of higher education of the city of New York, and (3) chairman of the Hunter College teachers' retirement board, which latter position he held ex officio as chairman of the college board of trustees.

Section 1549 of the Greater New York Charter provided as follows:

SEC. 1549. Any person holding office, whether by election or appointment, who shall, during his term of office, accept, hold, or retain any other civil office of honor, trust, or emolument under the Government of the United States (except commissioners for the taking of bail, or register of any court), or of the State (except the office of notary public or commissioner of deeds, or officer of the National Guard), or who shall hold or accept any other office connected with the government of the city of New York, or who shall accept a seat in the legislature, shall be deemed thereby to have vacated any office held by him under the city government.

The plaintiff, a citizen and taxpayer, brought an action pursuant to statute to prevent waste or injury to the property and finances of the city of New York. He moved for an injunction pendente lite to restrain the comptroller from paying the defendant, and to restrain the defendant from receiving, any compensation as a member of the city board of health. The appellate division held that the plaintiff was entitled to such an injunction. The court decided that the educational offices held by the defendant were not only offices connected with the government of the city of New York but were offices "under the city government." "Holding such offices," the court said, "we think the defendant 'shall be deemed thereby to have vacated any office held by him under the city government,' and that he must be deemed to have vacated, not only his office as a member

of the board of health, but all the other offices held by him under the city government. However, the only official position of the defendant under attack in this taxpayer's action is that of a member of the board of health, which, of the offices held by defendant, is alone a salaried position."

DEATHS DURING WEEK ENDED MAY 9, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended May 9, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended May 9, 1931	Corresponding week, 1930
Policies in force	75, 180, 287	75, 798, 638
Number of death claims	13, 955	14, 459
Death claims per 1,000 policies in force, annual rate	9. 7	9. 9

Deaths [1] from all causes in certain large cities of the United States during the week ended May 9, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended May 9, 1931				Corresponding week, 1930		Death rate [2] for the first 19 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (81 cities)	8, 297	12.2	662	[4] 50	13.1	804	13.6	13.3
Akron	48	9.7	1	10	8.8	8	9.6	8.6
Albany [5]	33	13.3	3	59	13.9	1	15.3	16.9
Atlanta	90	16.9	7	72	15.5	7	16.3	17.1
White	42	------	4	63	------	4	------	------
Colored	48	(6)	3	86	(6)	3	(6)	(6)
Baltimore [5]	205	13.1	14	47	15.5	13	16.7	15.7
White	151	------	11	48	------	9	------	------
Colored	54	(6)	3	47	(6)	4	(6)	(6)
Birmingham	69	13.4	8	80	15.9	7	15.4	14.5
White	30	------	5	86	------	4	------	------
Colored	39	(6)	3	73	(6)	3	(6)	(6)
Boston	215	14.3	19	54	16.9	36	16.3	16.3
Bridgeport	26	9.2	6	100	9.0	1	12.6	13.5
Buffalo	157	14.1	12	49	14.5	18	15.0	14.6
Cambridge	37	16.9	2	40	14.2	1	14.0	14.1
Camden	37	16.2	10	174	17.1	7	17.6	15.0
Canton	32	15.6	2	46	9.9	3	11.4	11.5
Chicago [5]	724	10.9	39	34	11.2	68	11.7	11.7
Cincinnati	138	15.7	7	42	17.8	12	17.8	17.4
Cleveland	196	11.2	19	55	11.3	25	12.5	12.5
Columbus	94	16.6	4	39	19.1	5	15.0	18.5
Dallas	47	9.0	7	------	12.7	8	12.5	12.4
White	34	------	6	------	------	5	------	------
Colored	13	(6)	1	------	(6)	3	(6)	(6)
Dayton	50	12.6	0	0	11.3	5	13.2	10.6
Denver	78	13.9	9	87	12.5	9	15.5	15.4
Des Moines	28	10.1	2	35	14.6	3	11.9	12.6
Detroit	266	8.4	18	29	10.3	38	9.5	10.6
Duluth	25	12.8	1	25	8.2	1	11.7	11.2
El Paso	34	16.9	7	------	17.2	6	18.0	18.5
Erie	24	10.6	1	19	13.4	4	11.6	11.2

Deaths from all causes in certain large cities of the United States during the week ended May 9, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended May 9, 1931				Corresponding week, 1930		Death rate [2] for the first 19 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Fall River [5] [7]	29	13.1	2	45	13.1	6	13.5	14.1
Flint	37	11.8	5	64	11.2	2	8.2	10.3
Fort Worth	44	13.7	3		13.7	4	12.5	11.8
White	28		3			4		
Colored	16	(6)	0		(6)	0	(6)	(6)
Grand Rapids	38	11.5	2	30	7.1	0	9.8	11.6
Houston	65	10.9	13		13.2	11	11.8	12.8
White	48		12			6		
Colored	17	(6)	1		(6)	5	(6)	(6)
Indianapolis	105	14.8	4	33	14.1	0	15.1	15.9
White	89		3	28		0		
Colored	16	(6)	1	67	(6)	0	(6)	(6)
Jersey City	61	10.0	8	71	16.6	17	13.3	13.1
Kansas City, Kans	24	10.2	5	103	13.2	4	14.8	12.4
White	19		5	123		3		
Colored	5	(6)	0	0	(6)	1	(6)	(6)
Kansas City, Mo	94	12.0	6	46	13.6	6	15.0	14.2
Knoxville	27	12.9	1	21	12.7	5	14.0	15.2
White	22		1	24		4		
Colored	5	(6)	0	0	(6)	1	(6)	(6)
Long Beach	29	9.9	4	97	9.1	0	10.7	10.5
Los Angeles	279	11.0	21	61	10.5	21	11.6	11.7
Louisville	74	12.5	8	69	15.8	3	16.4	14.8
White	62		5	49		3		
Colored	12	(6)	3	199	(6)	0	(6)	(6)
Lowell [7]	25	12.9	5	127	15.0	3	14.0	15.1
Lynn	15	7.6	1	26	13.2	4	11.6	12.3
Memphis	70	14.1	3	32	20.5	6	17.8	18.3
White	30		2	33		3		
Colored	40	(6)	1	29	(6)	3	(6)	(6)
Miami	22	10.2	1	25	10.3	1	14.1	12.9
White	19		0	0		1		
Colored	3	(6)	1	88	(6)	0	(6)	(6)
Milwaukee	119	10.5	13	56	11.3	18	10.4	10.7
Minneapolis	114	12.5	12	77	12.0	4	12.1	11.5
Nashville	43	14.4	3	45	11.8	0	17.9	17.2
White	27		1	20		0		
Colored	16	(6)	2	118	(6)	0	(6)	(6)
New Bedford [7]	28	13.0	3	80	10.7	1	13.5	12.3
New Haven	34	10.9	2	38	14.4	1	13.5	15.0
New Orleans	134	14.9	11	60	15.5	17	18.8	19.2
White	83		6	50		10		
Colored	51	(6)	5	81	(6)	7	(6)	(6)
New York	1,561	11.5	133	56	12.8	169	13.0	12.3
Bronx Borough	205	8.0	14	32	8.5	11	9.4	8.7
Brooklyn Borough	519	10.3	55	58	11.8	77	12.1	11.3
Manhattan Borough	648	18.6	54	92	18.5	56	20.0	18.3
Queens Borough	147	6.6	6	16	10.2	18	8.4	8.0
Richmond Borough	42	13.4	4	72	16.7	7	14.2	15.5
Newark, N. J	105	12.3	6	31	14.4	11	13.4	14.1
Oakland	45	8.0	4	51	8.6	1	11.6	11.7
Oklahoma City	46	12.2	1	14	8.3	4	12.3	10.3
Omaha	67	16.1	4	45	15.3	4	14.7	14.3
Paterson	33	12.4	5	86	15.4	5	15.5	13.7
Philadelphia	498	13.2	34	49	14.5	58	15.6	14.0
Pittsburgh	211	16.3	32	110	14.3	28	17.5	15.7
Portland, Oreg	73	12.4	1	12	10.2	2	12.6	13.4
Providence	75	15.3	9	83	15.6	5	14.9	15.3
Richmond	51	14.4	3	44	15.1	5	17.6	16.3
White	39		2	44		5		
Colored	12	(6)	1	43	(6)	0	(6)	(6)
Rochester	69	10.8	3	27	12.4	2	13.6	13.0
St. Louis	210	13.2	11	37	14.3	10	17.6	15.0
St. Paul	60	11.3	1	10	11.9	4	11.6	11.1
Salt Lake City [5]	32	11.7	1	15	13.0	2	13.3	14.1
San Antonio	80	17.4	19		19.2	11	15.7	18.4
San Diego	35	11.7	1	20	12.2	3	15.0	15.1
San Francisco	167	13.4	6	40	13.5	8	14.2	13.8
Schenectady	17	9.2	2	59	16.9	3	11.7	12.7
Seattle	87	12.2	3	28	8.2	2	12.9	11.8

Deaths from all causes in certain large cities of the United States during the week ended May 9, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended May 9, 1931				Corresponding week, 1930		Death rate [2] for the first 19 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Somerville	30	14 9	3	112	9 0	1	11.1	12.3
South Bend	14	6 8	1	25	7 5	3	9 1	9.8
Spokane	20	9 0	1	26	15 8	1	13 2	13 6
Springfield, Mass	51	17.5	5	77	12 1	2	13 9	14 1
Syracuse	50	12 2	5	59	13 9	3	12.9	13.2
Tacoma	17	8 2	0	0	13 2	2	14.4	13 3
Toledo	58	10 2	4	37	16 3	4	13 2	14.4
Trenton	45	18 9	3	52	19 0	7	19 3	17.9
Utica	43	21.9	4	104	17.9	2	16 5	17.4
Washington, D. C	136	14.4	12	66	17 8	11	17.9	16.4
White	83		7	57		6		
Colored	53	([6])	5	86	([6])	5	([6])	([6])
Waterbury	18	9 3	2	60	9 9	2	11.2	10 6
Wilmington, Del.[7]	29	14.2	2	43	15 7	3	16 5	15.9
Worcester	54	14 3	5	69	13 6	5	14 9	15.4
Yonkers	24	9 0	1	26	6 9	0	9.8	9.2
Youngstown	23	6 9	1	14	12.5	1	11.3	11.1

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 76 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15, Birmingham, 39; Dallas, 15, Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14, Knoxville, 15; Louisville, 17; Memphis, 38, Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C , 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for weeks Ended May 16, 1931, and May 17, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 16, 1931, and May 17, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 16, 1931	Week ended May 17, 1930	Week ended May 16, 1931	Week ended May 17, 1930	Week ended May 16, 1931	Week ended May 17, 1930	Week ended May 16, 1931	Week ended May 17, 1930
New England States:								
Maine	3	4	1		9	77	1	2
New Hampshire		4		4	76	2	0	0
Vermont					7	39	0	0
Massachusetts	25	59	1	4	570	1,474	2	7
Rhode Island	3	3			80	2	0	0
Connecticut	17	21	2		699	75	1	4
Middle Atlantic States:								
New York	131	120	[1] 11	[1] 16	3,261	2,851	14	19
New Jersey	42	83	5	10	1,124	1,483	8	4
Pennsylvania		106			3,635	1,580	9	18
East North Central States:								
Ohio	50	23	42	7	1,439	713	6	3
Indiana	12	17	5		1,048	137	7	5
Illinois	126	117	3	40	2,081	578	19	8
Michigan	34	63	7	4	263	2,243	9	24
Wisconsin	17	14	17	10	732	900	3	2
West North Central States:								
Minnesota	13	5			400	169	1	5
Iowa	4	4			58	478	0	4
Missouri	25	30	10	6	452	90	5	12
North Dakota	9	2			20	17	0	3
South Dakota	7	3			59	107	0	0
Nebraska	4	9	4		11	168	0	0
Kansas	23	13	5		99	776	1	1
South Atlantic States:								
Delaware		1			124	12	0	0
Maryland [2]	16	25	9	17	1,169	102	3	1
District of Columbia	8	5	1		353	47	2	0
West Virginia	8	6	17	14	79	97	0	2
North Carolina	17	18	10	15	948	60	1	1
South Carolina	11	6	391	245	134		0	2
Georgia	12		57	8	186	190	1	0
Florida	7	7	2	2	221	247	0	0
East South Central States:								
Kentucky					88	21	4	2
Tennessee	4	2	21	21	26	117	1	14
Alabama	9	4	58	9	198	112	7	2
Mississippi	5						0	5
West South Central States:								
Arkansas	1	4	16	23	48	52	1	2
Louisiana	16	11	50	16	2	23	4	2
Oklahoma [3]	8	8	95	36	30	184	0	2
Texas	21	27	55	40	45	259	0	1
Mountain States:								
Montana	1	2			5	10	0	1
Idaho		2			1	12	0	1
Wyoming					2	46	0	0
Colorado	6	5			100	641	1	0
New Mexico	1	1	1		84	43	0	3
Arizona	3	4	8	7	31	152	1	3
Utah [2]	2		5		5	311	0	2
Pacific States:								
Washington	4	1			108	579	0	3
Oregon	11	6	18	13	82	97	1	0
California	83	45	53	30	1,174	2,033	7	5

[1] New York City only.
[2] Week ended Friday.
[3] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

***Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 16, 1931, and May 17, 1930*—Continued**

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended May 16, 1931	Week ended May 17, 1930	Week ended May 16, 1931	Week ended May 17, 1930	Week ended May 16, 1931	Week ended May 17, 1930	Week ended May 16, 1931	Week ended May 17, 1930
New England States:								
Maine	0	0	27	26	0	0	2	12
New Hampshire	0	0	3	13	0	0	0	0
Vermont	0	0	3	4	0	1	0	0
Massachusetts	0	4	375	214	0	0	8	2
Rhode Island	0	0	69	20	0	0	0	8
Connecticut	0	1	42	71	0	0	5	0
Middle Atlantic States:								
New York	4	1	887	442	3	11	17	18
New Jersey	0	1	299	183	0	0	5	3
Pennsylvania	3	0	542	421	0	1	12	13
East North Central States:								
Ohio	1	1	612	166	29	79	9	6
Indiana	0	0	166	123	138	105	1	8
Illinois	1	0	576	369	94	161	4	17
Michigan	0	0	436	283	27	71	4	2
Wisconsin	1	0	144	165	15	13	0	0
West North Central States:								
Minnesota	0	0	70	111	6	6	4	0
Iowa	0	0	69	64	71	124	0	1
Missouri	1	0	216	96	29	37	2	9
North Dakota	0	0	15	28	3	36	0	1
South Dakota	1	0	9	12	9	58	0	0
Nebraska	0	0	44	35	64	47	0	0
Kansas	0	0	55	73	75	40	4	7
South Atlantic States:								
Delaware	0	0	17	12	0	0	0	0
Maryland [1]	0	0	68	70	0	0	6	7
District of Columbia	0	0	14	9	0	0	9	2
West Virginia	0	0	56	22	3	27	3	11
North Carolina	0	1	55	21	1	20	7	9
South Carolina	1	2	8	3	0	2	6	17
Georgia	0	0	57	15	0	0	10	8
Florida	0	0	6	4	2	0	0	2
East South Central States:								
Kentucky	0	0	45	23	36	20	6	3
Tennessee	0	9	17	27	7	19	5	12
Alabama	4	0	12	9	11	10	6	3
Mississippi	0	0	18	3	28	6	6	4
West South Central States:								
Arkansas	0	0	13	1	43	13	5	1
Louisiana	0	0	26	10	18	6	16	18
Oklahoma [2]	0	0	23	22	46	68	7	4
Texas	0	0	28	34	49	61	5	10
Mountain States:								
Montana	0	1	14	24	1	3	2	0
Idaho	0	0	6	2	1	1	1	1
Wyoming	0	0	17	10	1	6	0	0
Colorado	0	0	26	22	5	6	0	2
New Mexico	0	2	6	11	2	5	3	1
Arizona	0	1	2	6	0	9	1	4
Utah [1]	0	0	7	2	0	2	0	0
Pacific States								
Washington	0	0	27	36	18	62	6	4
Oregon	0	0	23	14	18	19	4	3
California	4	14	151	142	27	47	8	6

[1] Week ended Friday.
[2] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
April, 1931										
Colorado	3	25	2		790		0	138	12	3
District of Columbia	13	60	13		1,325		0	105	0	1
Indiana	46	107	143		4,267		2	1,165	436	13
Iowa	9	26			271		1	367	314	1
Massachusetts	8	182	31	1	2,200	1	5	1,586	0	12
New Jersey	24	218	62		3,843		2	1,341	0	12
Pennsylvania	47	360		2	17,932	1	2	2,413	1	44
South Carolina		70	3,871	694	566	411	4	83	13	15
Vermont		1			13			30	2	

April, 1931

	Cases
Anthrax:	
Iowa	1
Massachusetts	2
Chicken pox:	
Colorado	348
District of Columbia	107
Indiana	316
Iowa	334
Massachusetts	1,007
New Jersey	1,786
Pennsylvania	3,355
South Carolina	375
Vermont	79
Dengue:	
South Carolina	1
Diarrhea:	
South Carolina	327
Dysentery:	
New Jersey	1
German measles:	
Colorado	1
Iowa	23
Massachusetts	632
Pennsylvania	721
South Carolina	185
Hookworm disease.	
Indiana	1
South Carolina	84
Impetigo contagiosa:	
Colorado	2
Lead poisoning:	
Massachusetts	2
New Jersey	7
Pennsylvania	2
Leprosy:	
Indiana	1
Massachusetts	1
Lethargic encephalitis:	
District of Columbia	1
Iowa	1
Massachusetts	2
New Jersey	8
Pennsylvania	9
South Carolina	5
Mumps:	
Colorado	243
Indiana	85
Iowa	154
Massachusetts	767

Mumps—Continued.	Cases
New Jersey	289
Pennsylvania	2,211
South Carolina	157
Vermont	98
Ophthalmia neonatorum:	
Massachusetts	45
Pennsylvania	12
South Carolina	13
Paratyphoid fever.	
South Carolina	2
Puerperal septicemia:	
Pennsylvania	13
Rabies in animals:	
South Carolina	21
Rocky Mountain spotted or tick fever:	
Colorado	1
Septic sore throat:	
Colorado	2
Indiana	1
Massachusetts	19
Tetanus.	
Pennsylvania	4
Trachoma:	
Indiana	2
Massachusetts	4
Pennsylvania	3
Trichinosis:	
Iowa	1
Tularaemia.	
Pennsylvania	1
Undulant fever.	
District of Columbia	1
Massachusetts	1
New Jersey	8
Pennsylvania	1
Vermont	1
Vincent's angina.	
Iowa	2
Whooping cough:	
Colorado	285
District of Columbia	31
Indiana	309
Iowa	91
Massachusetts	615
New Jersey	833
Pennsylvania	896
South Carolina	219
Vermont	97

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 95 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,360,000. The estimated population of the 88 cities reporting deaths is more than 31,815,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended May 9, 1931, and May 10, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	877	1,051	
95 cities	428	487	760
Measles:			
44 States	19,575	18,777	
95 cities	8,372	8,894	
Meningococcus meningitis:			
46 States	116	216	
95 cities	62	91	
Poliomyelitis:			
46 States	25	24	
Scarlet fever:			
46 States	5,367	3,917	
95 cities	2,494	1,625	1,323
Smallpox:			
46 States	784	1,257	
95 cities	93	151	64
Typhoid fever:			
46 States	168	203	
95 cities	29	41	33
Deaths reported			
Influenza and pneumonia:			
88 cities	793	856	
Smallpox:			
88 cities	0	1	
Omaha, Nebr	0	1	

City reports for week ended May 9, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	4	0	0	----------	0	1	8	1
New Hampshire:								
Concord	0	0	0	----------	0	10	0	0
Manchester	0	0	0	----------	0	0	0	1
Vermont:								
Barre	1	0	0	----------	0	0	0	1
Burlington	0	0	1	----------	0	0	0	0
Massachusetts:								
Boston	69	30	3	4	0	85	10	22
Fall River	1	2	3	1	1	5	12	1
Springfield	2	2	0	----------	0	8	9	2
Worcester	8	3	4	----------	0	2	33	4
Rhode Island:								
Pawtucket	----------	1	----------	----------	----------	----------	----------	----------
Providence	21	5	3	----------	0	88	18	7
Connecticut:								
Bridgeport	2	3	1	----------	0	9	3	4
Hartford	4	5	0	1	1	47	1	7
New Haven	13	1	0	----------	0	187	12	5
MIDDLE ATLANTIC								
New York:								
Buffalo	11	10	7	----------	0	277	51	24
New York	317	239	105	11	10	1,480	77	193
Rochester	3	4	1	----------	0	75	25	2
Syracuse	5	2	1	----------	0	9	0	4
New Jersey:								
Camden	6	7	3	2	2	10	4	4
Newark	121	15	6	5	1	33	16	4
Trenton	9	2	1	3	0	7	5	7
Pennsylvania:								
Philadelphia	78	58	10	2	7	1,185	45	51
Pittsburgh	50	16	2	4	5	120	38	30
Reading	3	2	1	----------	0	10	10	2
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	11	5	5	1	2	85	15	13
Cleveland	160	22	13	12	3	150	337	22
Columbus	8	3	3	2	0	15	2	5
Toledo	39	3	2	----------	0	----------	13	3
Indiana:								
Fort Wayne	0	1	0	----------	0	2	0	1
Indianapolis	24	3	4	----------	1	370	23	8
South Bend	3	1	1	----------	0	20	0	2
Terre Haute	4	0	0	----------	0	1	0	2
Illinois:								
Chicago	150	83	80	3	6	777	85	49
Springfield	10	0	1	----------	0	42	5	2

City reports for week ended May 9, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
EAST NORTH CENTRAL—continued								
Michigan:								
Detroit	127	41	23	6	6	15	65	20
Flint	33	2	0		0	1	9	5
Grand Rapids	6	2	1		0	44	3	4
Wisconsin:								
Kenosha	1	0	1		0	0	118	0
Madison	20	0	1			2	46	
Milwaukee	98	10	3		0	288	524	9
Racine	6	1	0		0	4	13	0
Superior	3	0	0		0	0	0	1
WEST NORTH CENTRAL								
Minnesota:								
Duluth	9	0	0		1	1	5	2
Minneapolis	66	12	2		0	150	158	6
St. Paul	63	8	0		0	25	2	6
Iowa:								
Davenport	0	0	0			0	0	
Des Moines	2	1	0			0	0	
Sioux City	23	0	0			3	17	
Waterloo	0	0	0			3	0	
Missouri:								
Kansas City	21	3	3		0	300	4	9
St. Joseph	4	1	4		0	13	0	1
St. Louis	25	30	18			22	12	5
North Dakota:								
Fargo	0	0	0		0	4	9	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	3	1	0			3	0	
Sioux Falls	0	0	0			0	0	
Nebraska:								
Omaha	9	2	7		0	1	35	6
Kansas:								
Topeka	4	1	1	1	1	3	42	4
Wichita	7	1	2		0	6	4	2
SOUTH ATLANTIC								
Delaware:								
Wilmington	3	1	0		0	43	1	2
Maryland:								
Baltimore	66	20	10	2	0	847	36	21
Cumberland	0	0	0	1	0	1	0	1
Frederick	0	0	0		0	18	0	0
District of Columbia:								
Washington	23	12	7	5	6	299	0	17
Virginia:								
Lynchburg	14	1	0		0	6	0	0
Norfolk	15	0	0	2	0	220	0	3
Richmond	2	2	5		0	342	0	5
Roanoke	5	0	0		0	10	2	0
West Virginia:								
Charleston	1	0	0		0	0	0	2
Wheeling	28	0	0		0	2	0	0
North Carolina:								
Raleigh	11	0	0		0	47	0	2
Wilmington	1	0	0		0	0	0	1
Winston-Salem	13	0	0		0	55	17	1
South Carolina:								
Charleston	0	0	1	7	0	1	0	0
Columbia	0	0	0		0	0	2	7
Greenville	0	0	0		0	0	1	0
Georgia:								
Atlanta	1	2	6	12	5	40	0	5
Brunswick	0	0	0		0	0	2	0
Savannah	5	0	1	15	0	16	12	2
Florida:								
Miami	2	2	1		0	61	2	0
St. Petersburg		0			0			0
Tampa	8	0	2		0	72	14	0

City reports for week ended May 9, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	1	1	2	----------	0	25	0	8
Tennessee:								
Memphis	21	2	3	----------	2	122	0	6
Nashville	0	1	1	----------	3	54	1	2
Alabama:								
Birmingham	6	2	0	----------	2	11	2	8
Mobile	1	0	0	1	1	1	0	0
Montgomery	3	0	1	----------	----------	4	0	----------
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	4	0	0	----------	----------	0	0	----------
Little Rock	6	0	0	----------	1	4	4	6
Louisiana:								
New Orleans	6	8	14	2	2	1	0	12
Shreveport	2	0	0	----------	0	1	0	1
Oklahoma:								
Muskogee	31	0	0	1	0	1	2	0
Texas:								
Dallas	37	4	6	1	0	4	34	1
Forth Worth	13	2	0	----------	2	0	2	4
Galveston	0	0	1	----------	0	2	0	0
Houston	3	4	6	----------	0	9	0	5
San Antonio	1	2	5	----------	1	21	1	8
MOUNTAIN								
Montana:								
Billings	----------	0	----------	----------	----------	----------	----------	----------
Great Falls	6	0	1	----------	0	0	0	0
Helena	0	0	0	----------	0	0	0	0
Missoula	0	0	0	----------	0	0	0	0
Idaho:								
Boise	----------	0	0	----------	----------	----------	----------	----------
Colorado:								
Denver	55	9	1	----------	3	39	36	3
Pueblo	1	0	0	----------	0	20	0	3
New Mexico:								
Albuquerque	7	0	0	----------	1	1	0	0
Utah:								
Salt Lake City	11	2	1	----------	0	3	20	2
Nevada:								
Reno	0	0	0	----------	0	0	0	3
PACIFIC								
Washington:								
Seattle	52	2	2	----------	----------	10	49	----------
Spokane	0	2	1	----------	----------	0	0	----------
Tacoma	6	0	0	----------	0	0	18	2
Oregon:								
Portland	19	6	1	1	1	36	14	3
Salem	3	0	1	2	0	14	12	0
California:								
Los Angeles	64	30	22	29	2	146	28	11
Sacramento	4	2	1	----------	0	55	0	3
San Francisco	27	13	5	1	1	45	5	13

City reports for week ended May 9, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	4	7	0	0	0	0	0	0	0	7	21
New Hampshire:											
Concord	0	1	0	0	0	0	0	0	0	0	7
Manchester	1	4	0	0	0	2	0	1	1	0	22
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	1	2
Burlington	0	0	0	0	0	1	0	0	0	3	11
Massachusetts:											
Boston	73	117	0	0	0	14	1	1	0	25	215
Fall River	4	74	0	0	0	3	0	0	0	1	29
Springfield	9	15	0	0	0	3	0	0	0	4	46
Worcester	8	38	0	0	0	2	0	0	0	3	------
Rhode Island:											
Pawtucket	1	------	0	------	------	------	0	------	------	------	------
Providence	12	45	0	0	0	7	0	1	0	2	75
Connecticut:											
Bridgeport	9	10	0	0	0	1	0	0	0	0	26
Hartford	5	4	0	0	0	1	0	0	0	2	29
New Haven	6	2	0	0	0	0	0	0	0	4	34
MIDDLE ATLANTIC											
New York:											
Buffalo	24	18	0	6	0	8	0	0	0	48	154
New York	294	564	0	0	0	106	9	7	1	198	1,561
Rochester	10	67	0	0	0	3	0	0	0	14	66
Syracuse	10	38	0	0	0	1	0	0	0	12	50
New Jersey:											
Camden	4	7	0	0	0	1	0	0	0	3	37
Newark	29	38	0	0	0	7	0	0	0	51	109
Trenton	3	5	0	0	0	2	0	3	0	0	45
Pennsylvania:											
Philadelphia	94	173	0	0	0	33	2	1	0	39	498
Pittsburgh	29	91	0	0	0	8	0	0	0	19	211
Reading	5	1	0	0	0	1	0	0	0	0	25
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	16	41	2	0	0	9	1	0	0	2	138
Cleveland	39	83	0	0	0	14	1	0	0	19	196
Columbus	7	9	1	0	0	0	0	0	3	1	94
Toledo	11	5	1	1	0	3	0	1	0	5	58
Indiana:											
Fort Wayne	4	4	1	0	0	1	0	1	0	0	37
Indianapolis	12	44	7	4	0	6	0	1	0	49	------
South Bend	5	0	1	3	0	1	0	0	0	3	14
Terre Haute	2	4	1	2	0	0	0	0	0	0	15
Illinois:											
Chicago	117	238	2	1	0	38	2	0	0	53	724
Springfield	3	10	0	0	------	0	0	0	0	0	22
Michigan:											
Detroit	114	205	1	0	0	17	2	2	2	92	266
Flint	10	33	2	0	0	1	0	0	0	18	37
Grand Rapids	11	15	1	0	0	0	1	0	0	12	38
Wisconsin:											
Kenosha	2	0	0	0	0	0	0	0	0	0	9
Madison	4	0	0	------	------	------	0	0	------	2	------
Milwaukee	26	28	0	0	0	5	0	0	0	108	119
Racine	4	7	0	0	0	0	0	0	0	19	10
Superior	2	1	0	0	0	0	0	0	0	0	4
WEST NORTH CENTRAL											
Minnesota:											
Duluth	7	1	0	0	0	0	0	1	0	0	25
Minneapolis	31	16	0	2	0	5	0	0	0	28	114
St. Paul	22	11	1	3	0	4	0	0	0	20	61

City reports for week ended May 9, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—continued											
Iowa:											
Davenport	1	0	1	9	--------	-------	0	0	--------	0	--------
Des Moines	8	8	2	9	--------	-------	0	0	--------	0	28
Sioux City	2	8	1	1	--------	-------	0	0	--------	4	--------
Waterloo	2	0	0	0	--------	-------	0	0	--------	17	--------
Missouri:											
Kansas City	18	3	1	5	0	4	0	0	0	6	94
St. Joseph	4	3	1	0	0	0	0	0	0	1	10
St. Louis	33	168	2	6	0	9	1	0	0	19	210
North Dakota:											
Fargo	1	8	0	-------	0	0	0	0	0	5	3
Grand Forks	0	0	0	0	0	-------	0	0	0	0	--------
South Dakota:											
Aberdeen	0	0	0	0	--------	-------	0	0	--------	0	--------
Sioux Falls	2	2	1	1	--------	-------	0	0	--------	0	9
Nebraska:											
Omaha	3	9	4	10	0	3	0	0	1	1	67
Kansas:											
Topeka	2	0	0	1	0	0	0	0	0	0	15
Wichita	2	3	1	13	0	0	0	0	0	9	33
SOUTH ATLANTIC											
Delaware:											
Wilmington	4	7	0	0	0	3	0	0	0	1	29
Maryland:											
Baltimore	37	39	0	0	0	22	1	1	0	30	205
Cumberland	1	0	0	0	0	0	0	0	0	0	10
Frederick	0	0	0	0	0	0	0	0	0	0	5
District of Columbia:											
Washington	24	32	1	0	0	10	0	1	0	5	136
Virginia:											
Lynchburg	1	0	0	0	0	0	0	0	0	0	11
Norfolk	1	1	0	0	0	2	0	0	0	6	--------
Richmond	3	9	0	0	0	5	0	0	0	0	53
Roanoke	0	1	0	0	0	0	0	1	0	0	12
West Virginia:											
Charleston	1	1	0	0	0	2	0	1	1	0	31
Wheeling	1	1	0	0	0	0	1	0	0	0	19
North Carolina:											
Raleigh	0	0	0	0	0	2	0	0	0	31	15
Wilmington	0	0	0	0	0	0	0	0	0	15	11
Winston-Salem	1	0	1	0	0	0	0	0	0	20	17
South Carolina:											
Charleston	0	0	1	0	0	3	1	0	0	0	25
Columbia	0	0	0	0	0	0	0	0	0	0	15
Greenville	0	1	0	0	0	0	0	0	0	3	--------
Georgia:											
Atlanta	4	48	2	4	0	6	0	0	1	6	90
Brunswick	0	0	0	0	0	0	0	0	0	0	4
Savannah	0	1	1	0	0	1	1	0	0	12	33
Florida:											
Miami	0	0	0	0	0	1	1	0	0	1	22
St. Petersburg	0	-------	0	-------	0	1	0	-------	0	--------	15
Tampa	1	1	0	0	0	0	1	0	0	0	23
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	11	0	0	0	1	0	0	0	0	20
Tennessee:											
Memphis	7	22	0	7	0	11	1	0	0	17	70
Nashville	1	4	0	0	0	3	1	1	0	10	43
Alabama:											
Birmingham	1	5	1	0	0	6	0	0	0	13	69
Mobile	0	0	0	0	0	0	0	0	0	1	14
Montgomery	0	1	0	0	--------	-------	0	0	--------	0	--------

City reports for week ended May 9, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0			0	0		8	
Little Rock	0	1	0	0	0	3	0	0	0	1	10
Louisiana:											
New Orleans	10	16	0	14	0	18	2	1	0	1	134
Shreveport	0	0	1	1	0	2	0	0	0	5	27
Oklahoma:											
Muskogee	0	0	2	0			0	0		0	
Texas:											
Dallas	4	4	2	1	0	2	0	0	0	20	47
Fort Worth	2	2	3	8	0	1	0	0	0	0	44
Galveston	0	0	0	0	0	1	1	1	0	0	11
Houston	2	6	1	3	0	3	1	0	0	0	65
San Antonio	1	4	0	0	0	2	0	0	0	0	80
MOUNTAIN											
Montana:											
Billings	0		0								
Great Falls	1	3	0	0	0	0	0	0	0	6	12
Helena	0	1	0	0	0	0	0	0	0	0	6
Missoula	1	1	0	0	0	1	0	0	0	0	7
Idaho:											
Boise	0		1				0				
Colorado:											
Denver	12	11	1	0	0	6	0	0	0	29	76
Pueblo	1	2	0	0	0	0	0	0	0	19	9
New Mexico:											
Albuquerque	0	0	0	0	0	4	0	0	0	0	8
Utah:											
Salt Lake City	2	1	1	0	0	1	0	0	0	37	32
Nevada:											
Reno	1	0	0	0	0	0	0	0	0	0	4
PACIFIC											
Washington:											
Seattle	8	13	3	0			0	1		93	
Spokane	5	0	7	1			0	0		0	
Tacoma	2	0	3	1	0	1	0	0	0	2	17
Oregon:											
Portland	7	3	9	1	0	3	0	0	0	0	78
Salem	0	0	0	0			0	0		0	
California:											
Los Angeles	30	33	6	4	0	16	1	2	0	30	279
Sacramento	2	0	1	0	0	3	0	1	0	30	29
San Francisco	21	8	1	0	0	14	1	0	0	41	162

City reports for week ended May 9, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
NEW ENGLAND									
Massachusetts:									
Boston	1	1	0	0	0	0	0	1	0
Worcester	1	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
Buffalo	2	2	0	1	0	0	0	0	0
New York	4	4	2	1	0	0	1	3	1
New Jersey:									
Newark	1	0	0	0	0	0	0	0	0
Trenton	0	0	1	1	0	0	0	0	0
Pennsylvania:									
Philadelphia	4	2	0	1	0	0	0	0	0
Pittsburgh	2	1	0	1	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cleveland	2	0	0	0	0	0	0	0	0
Columbus	1	1	0	0	0	0	0	0	0
Indiana:									
Indianapolis [1]	1	1	0	0	0	0	0	0	0
Illinois:									
Chicago	13	5	1	1	0	0	0	0	0
Springfield	1	0	0	0	0	0	0	0	0
Michigan:									
Detroit	2	1	2	1	0	0	1	0	0
Flint	1	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL									
Missouri:									
Kansas City	0	1	0	0	0	0	0	0	0
St. Joseph	4	0	0	0	0	0	0	0	0
St. Louis	4	2	0	0	0	0	0	0	0
North Dakota:									
Fargo	0	0	0	1	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	1	0	1	0	2	2	0	0	0
District of Columbia:									
Washington	0	0	0	0	0	1	0	0	0
Virginia:									
Norfolk	0	0	0	0	0	1	0	0	0
West Virginia:									
Charleston	[2] 1	[2] 1	0	0	0	0	0	0	0
North Carolina:									
Wilmington	0	0	0	0	1	0	0	0	0
Winston-Salem	0	0	0	0	0	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	4	1	0	0	0
Columbia	1	1	0	0	0	1	0	0	0
Georgia:									
Atlanta	1	0	0	0	1	0	0	0	0
Savannah	0	0	0	0	1	0	0	0	0
Florida:									
Miami	0	0	0	0	1	0	0	0	0
Tampa	1	0	0	0	0	0	0	1	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	0	1	0	0	0	0	0	0	0
Nashville	1	1	0	0	0	0	0	0	0
Alabama:									
Birmingham	3	0	0	0	1	0	0	1	0

[1] Rabies (in man): 1 death at Indianapolis, Ind.
[2] Nonresident.

City reports for week ended May 9, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	2	2	0	0	1	0	0	0	0
Shreveport	0	0	0	0	0	2	0	0	0
Texas:									
Dallas	0	0	0	0	3	0	0	0	0
Galveston	0	0	0	0	0	1	0	0	0
Houston	2	1	0	0	0	0	0	0	0
San Antonio	1	1	0	0	0	0	0	0	0
MOUNTAIN									
Colorado:									
Denver	0	1	0	1	0	0	0	0	0
PACIFIC									
Washington:									
Seattle	1	0	0	0	0	0	0	0	0
Tacoma	0	0	0	0	0	0	0	1	0
California:									
Los Angeles	1	1	0	0	0	0	0	0	0
Sacramento	1	0	0	0	0	0	0	0	0
San Francisco	1	0	1	0	1	1	0	0	0

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended May 9, 1931, compared with those for a like period ended May 10, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, April 5 to May 9, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Apr. 11, 1931	Apr. 12, 1930	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930
98 cities	65	93	66	86	53	91	[2] 64	83	[3] 67	77
New England	84	82	79	119	58	85	36	82	[9] 35	65
Middle Atlantic	59	92	62	83	46	99	61	72	61	85
East North Central	86	115	83	96	58	113	[4] 87	130	82	103
West North Central	63	89	63	87	67	68	[5] 64	68	71	45
South Atlantic	49	80	65	64	51	64	[6] 70	50	63	62
East South Central	17	6	23	18	23	48	6	0	41	6
West South Central	54	153	74	206	71	101	68	94	108	73
Mountain	35	79	17	9	26	88	[7] 27	44	[8] 28	70
Pacific	57	51	43	36	63	49	53	61	61	49

MEASLES CASE RATES

	Apr. 11, 1931	Apr. 12, 1930	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930
98 cities	1,326	1,195	1,316	1,227	1,342	1,356	[2] 1,259	1,293	[3] 1,308	1,411
New England	1,503	1,562	1,349	1,628	1,286	1,710	904	1,942	[9] 1,103	2,303
Middle Atlantic	1,422	966	1,543	1,097	1,418	1,192	1,411	1,284	1,433	1,295
East North Central	831	904	790	1,074	1,075	999	[4] 923	1,005	1,102	927
West North Central	704	1,199	589	1,009	830	1,352	[5] 692	1,003	1,016	1,269
South Atlantic	4,546	1,067	4,343	1,089	4,049	1,306	[6] 3,919	1,188	3,553	1,298
East South Central	1,751	329	1,612	299	1,600	407	1,426	185	1,263	442
West South Central	68	721	101	502	139	592	156	731	152	711
Mountain	844	7,674	923	6,793	661	8,802	[7] 686	5,912	[8] 576	9,128
Pacific	499	2,059	417	1,800	517	2,067	505	1,773	501	1,992

SCARLET FEVER CASE RATES

	Apr. 11, 1931	Apr. 12, 1930	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930
98 cities	362	320	382	298	405	262	[2] 373	296	[3] 390	258
New England	474	351	584	402	575	348	582	268	[9] 631	310
Middle Atlantic	413	281	415	262	488	239	409	285	448	266
East North Central	338	430	383	391	432	360	[4] 399	394	439	318
West North Central	537	309	518	366	469	248	[5] 521	384	440	238
South Atlantic	355	308	306	302	304	248	[6] 274	294	276	242
East South Central	465	132	582	143	396	121	407	132	250	138
West South Central	105	108	112	115	98	59	132	115	105	94
Mountain	174	335	278	352	191	229	[7] 199	361	[8] 177	370
Pacific	104	217	116	144	86	176	94	109	106	130

SMALLPOX CASE RATES

	Apr. 11, 1931	Apr. 12, 1930	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930
98 cities	19	29	22	27	21	30	[2] 23	27	[3] 15	24
New England	0	2	0	2	0	0	0	0	[9] 0	2
Middle Atlantic	1	0	2	0	1	0	1	1	3	0
East North Central	6	23	19	23	20	18	[4] 11	21	6	22
West North Central	96	149	92	139	71	145	[5] 123	132	78	101
South Atlantic	18	10	10	4	6	0	[6] 6	0	8	0
East South Central	0	12	52	18	35	42	58	86	41	6
West South Central	81	28	95	70	98	38	101	31	64	38
Mountain	17	62	9	26	17	97	[7] 0	150	[8] 0	79
Pacific	53	89	27	71	41	109	51	73	12	83

1 The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931, and 1930, respectively.
2 South Bend, Ind., Flint, Mich., St. Paul, Minn., Wilmington, N. C., and Boise, Idaho, not included.
3 Pawtucket, R. I., Billings, Mont., and Boise, Idaho, not included.
4 South Bend, Ind., and Flint, Mich., not included.
5 St. Paul, Minn., not included.
6 Wilmington, N. C., not included.
7 Boise, Idaho, not included.
8 Billings, Mont., and Boise, Idaho, not included.
9 Pawtucket, R. I., not included.

Summary of weekly reports from cities, April 5 to May 9, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	Apr. 11, 1931	Apr. 12, 1930	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930
98 cities	5	5	5	6	3	6	[2] 6	6	[3] 5	6
New England	2	0	2	7	2	5	7	2	[9] 5	0
Middle Atlantic	5	1	4	2	4	5	7	3	5	4
East North Central	3	1	2	2	2	6	[4] 4	6	2	2
West North Central	0	4	4	8	4	4	[5] 2	4	2	8
South Atlantic	16	22	8	22	2	12	[6] 14	6	8	16
East South Central	6	18	12	6	6	0	12	24	6	18
West South Central	3	7	7	7	0	24	0	21	7	3
Mountain	0	44	9	18	9	0	[7] 0	53	[8] 0	18
Pacific	8	4	10	8	4	4	6	6	8	20

INFLUENZA DEATH RATES

	Apr. 11, 1931	Apr. 12, 1930	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930
91 cities	18	16	17	15	13	12	[2] 11	9	[3] 12	9
New England	19	7	7	7	7	12	7	5	[9] 5	10
Middle Atlantic	12	20	12	14	12	9	12	9	11	10
East North Central	14	8	10	12	6	14	[4] 5	7	11	9
West North Central	15	9	29	18	18	9	[5] 10	9	6	3
South Atlantic	30	26	32	22	10	12	[6] 20	16	22	6
East South Central	69	45	76	58	44	39	19	19	50	13
West South Central	45	25	45	25	55	25	38	21	14	28
Mountain	17	26	17	9	17	18	[7] 27	0	[8] 28	0
Pacific	19	12	10	2	5	0	2	5	7	7

PNEUMONIA DEATH RATES

	Apr. 11, 1931	Apr. 12, 1930	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930
91 cities	155	164	161	149	137	140	[2] 122	135	[3] 117	133
New England	173	186	144	160	132	189	154	164	[9] 135	131
Middle Atlantic	168	185	180	180	165	160	141	163	144	176
East North Central	118	127	128	114	98	108	[4] 75	107	87	92
West North Central	253	150	244	156	230	81	[5] 192	114	121	126
South Atlantic	199	230	188	202	168	210	[6] 176	204	130	132
East South Central	176	201	290	207	126	227	120	123	120	142
West South Central	169	181	173	121	145	132	152	110	114	164
Mountain	191	185	113	167	104	150	[7] 63	62	[8] 102	123
Pacific	60	72	67	37	46	50	46	42	70	52

[2] South Bend, Ind., Flint, Mich., St. Paul, Minn., Wilmington, N. C., and Boise, Idaho, not included.
[3] Pawtucket, R. I., Billings, Mont., and Boise, Idaho, not included.
[4] South Bend, Ind., and Flint, Mich., not included.
[5] St. Paul, Minn., not included.
[6] Wilmington, N. C., not included.
[7] Boise, Idaho, not included.
[8] Billings, Mont., and Boise, Idaho, not included.
[9] Pawtucket, R. I., not included.

FOREIGN AND INSULAR

CANADA

Quebec Province—Communicable diseases—Week ended May 9, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended May 9, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Puerperal fever	1
Chicken pox	59	Scarlet fever	50
Diphtheria and croup	12	Tuberculosis	53
German measles	13	Typhoid fever	20
Measles	649	Whooping cough	40
Mumps	18		

CUBA

Provinces—Communicable diseases—Four weeks ended March 14, 1931.—During the four weeks ended March 14, 1931, cases of certain communicable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer			1	1	3		5
Cerebrospinal meningitis		1					1
Chicken pox		54	3	20		1	78
Diphtheria		24	1	3		1	29
Malaria	1	4		1	4	62	72
Measles		34		16	1		51
Paratyphoid fever		1		2	1	1	5
Poliomyelitis		1					1
Scarlet fever		6		2			8
Tetanus (infantile)					2		2
Typhoid fever	8	17	4	30	16	18	93

CZECHOSLOVAKIA

Communicable diseases—March, 1931.—During the month of March, 1931, certain communicable diseases were reported in the Republic of Czechoslovakia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	6		Paratyphoid fever	9	2
Cerebrospinal meningitis	11	5	Scarlet fever	1,043	20
Diphtheria	1,350	96	Trachoma	169	
Dysentery	4		Typhoid fever	279	35
Malaria	18		Typhus fever	5	

DENMARK

Communicable diseases—February, 1931.—During the month of February, 1931, cases of certain communicable diseases were reported in Denmark, as follows:

Disease	Cases	Disease	Cases
Anthrax	1	Paratyphoid fever	4
Cerebrospinal meningitis	8	Poliomyelitis	3
Chicken pox	47	Puerperal fever	16
Diphtheria and croup	353	Scabies	735
Erysipelas	258	Scarlet fever	103
German measles	4	Syphilis	166
Influenza	57,337	Tetanus	1
Lethargic encephalitis	8	Typhoid fever	1
Measles	1,294	Undulant fever (Bac. abort. Bang)	42
Mumps	436	Whooping cough	1, 788

ESTONIA

Vital statistics—1920, 1929, and 1930.—The estimated populations, as of July 1 of each year, the numbers of births, birth rates per 1,000 population, and deaths and death rates per 1,000 population in Estonia for the years 1920, 1929, and 1930 are given in the following table:

Year	Estimated mid-year population	Births		Deaths	
		Number	Per 1,000 population	Number	Per 1,000 population
1920	1,067,772	19,625	18.4	21,363	20.0
1929	1,115,650	19,110	17.1	20,178	18.1
1930	1,116,072	19,410	17.4	16,598	14.9

GERMANY

Vital statistics—1924–1929.—A report based on data from *Wirtschaft und Statistik*, of February 26, 1931, states that a gradual increase in the general death rate in Germany is expected, owing to the steady increase in the number of individuals in the higher age groups. The following table gives mortality data for the years 1924 to 1929.

	Number of deaths	Deaths per 1,000 population	Deaths under 1 year of age per 1,000 live births
Average, 1924 to 1926	746,042	11.9	105
1927	757,020	12.0	97
1928	739,520	11.6	89
1929	805,962	12.6	96

Cities of more than 15,000 population—Vital statistics—1928–1930.—According to preliminary figures published for the year 1930, the number of marriages in German cities with more than 100,000 inhabitants decreased from 10.3 per 1,000 in 1929 to 9.8 in 1930. The number of live births reported in these cities was 13.0 per 1,000 as compared with 13.3 in 1929. The following table gives the birth and death rates per 1,000 inhabitants in cities for the years 1928–1930.

	Birth rate per 1,000 population			Death rate of residents per 1,000 population (exclusive of stillbirths)		
	1928	1929	1930	1928	1929	1930
Large cities	13.6	13.3	13.0	10.6	11.5	10.1
Communities of—						
50,000 to 100,000 population	16.1	15.5	15.2	10.3	11.4	9.9
30,000 to 50,000 population	16.2	15.6	15.1	10.1	11.0	9.7
15,000 to 30,000 population	16.2	15.4	14.8	9.7	10.9	9.6
Total communities with more than 15,000 population	14.5	14.0	13.7	10.4	11.4	10.0

MEXICO

Vera Cruz—Deaths—March 30 to May 3, 1931.—During the 5-week period from March 30 to May 3, 1931, deaths from certain causes were reported in Vera Cruz, Mexico, as follows:

Disease	Deaths	Disease	Deaths
Bronchitis	4	Pneumonia	7
Cancer	1	Pyemia	1
Dysentery	1	Septicemia	1
Erysipelas	2	Syphilis	4
Gastro-intestinal disorders	27	Tetanus	3
Hookworm disease	3	Tuberculosis	23
Malaria	1	Whooping cough	1
Meningitis	1		
Pleurisy	1	Total, all causes	167

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931			March, 1931				April, 1931				May, 1931		
					14	21	28	7	14	21	28	4	11	18	25	2	9	16
Ceylon: Colombo	C								1									
China.																		
Canton	C												1					
India	C	11,112	10,687	15,334	3,529	2,549	3,173	2,293	2,471	857	2,551							
	D	5,933	5,689	8,123	1,846	1,325	1,703	1,257	1,252	473	1,314							
Bassein	C														2			
	D														2			
Bombay	C	13		21									2					
	D	7		9									1					
Calcutta	C	22	28	121	27	33	45	65	80	102	129	125	95	82	71			
	D	16	20	36	22	25	26	39	49	68	69	70	55	51	44			
Karikal	C		1		4		1	4	2	1	7	2						
	D				4			4	2	1	7	2						
Madras	C		201	99	18	20	19	15	4	5	7	4	3	1	4	18		
	D		67	47	5	4	14	6	5	3	2		5	1	3	5		
Negapatam	D			3	1		2											
Rangoon	C		1															
	D		1	1														
Tuticorin	C	5	1	1		1												
India (French):																		
Chandernagor	C	1	2	1		1	2	2	2	2	2	1			1			
	D		3	1		1	3	1	2	3	1							
Pondicherry	C	4	31	19	10	20	31	39	29	25	26	20	5	3				
	D	4	21	11	10	9	6	9	6	5	4	3	1	3				
India (Portuguese)	C		1															
Indo-China (see also table below):																		
Pnompenh	C	2		4		3	3	3					1	1				
	D	2		2		1	2	2		1					1			
Saigon and Cholon	C	3	9	6			3	1	1		1	3	2	3	7	15		
	D	1	4	3			3	1	2	1	1	1		3	6	13		
Persia: Rafsandjan	C																31	
	D																12	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec 13, 1930	Dec. 14, 1930–Jan 10, 1931	Jan. 11–Feb 7, 1931	Week ended— February, 1931			March, 1931				April, 1931				May, 1931		
					14	21	28	7	14	21	28	4	11	18	25	2	9	16
Philippine Islands: [1]																		
Iloilo	C	1	1	2														
	D	3	1	2														
Provinces—																		
Capiz	C			59	69	54	28	35	29	11	4	4		3	8	18	11	3
	D			47	55	39	23	29	24	10	4	3		3	8	13	11	3
Iloilo	C	45	28	145	27	42	10	16	2	5								
	D	27	22	110	21	22	11	11	2	2								
Masbate	C								21									
	D								9									
Negros, Occidental	C	163	120	90	1	1	2											
	D	123	97	56	1	1	2											
Negros, Oriental	C			1														
	D			1														
Pampanga	C																1	
Samar	C	8	17															
	D	8	9															
Siam	C	6	2	3		1				4	4	2					11	
	D	6	2	1						1	1						3	
Ayudhaya District	C											1						
Bangkok	C	4	2	3	1			1		1	1		1		1			
	D	4	2	1				1		1	1							
Bismulok Province	C									4	4							
	D									1	1							

Place		October, 1930	November, 1930	December, 1930			January, 1931			February, 1931			March, 1931		
				1–10	11–20	21–31	1–10	11–20	21–31	1–10	11–20	21–28	1–10	11–20	21–31
Indo-China (French) (see also table above):															
Cambodia [2]	C	22	26	28			7	19	36		35				65
Cochin-China [2]	C	28	13	8			7	4	13		5				23

[1] Figures for cholera in the Philippine Islands are subject to correction.

[2] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931: 14	21	28	March, 1931: 7	14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9	16
Algeria:																		
Algiers	C	2	1	2	1							1						
	D											1						
Bone	C			1														
Constantine, vicinity of	C		50	1	1													
	D			1														
Philippeville	C		1															
	D		1															
Argentina:																		
Cordoba Province	C			1		2												
Entre Rios Province—Diamante	C						2											
Jujuy Province—Palpala	C			1		1												
Santa Fe	C					2												
Belgian Congo	C	1								2								
	D	1								2								
British East Africa (see also table below):																		
Tanganyika	C	3	2				15	7		8								
	D	3	2				4			1								
Uganda	C	111	67	25	6	4		5	4	7	4							
	D	112	67	24	6	4		5	4	7	4							
Ceylon: Colombo	C	9	9	8	6	2	1	2	1	3	3	1	1	3			1	
	D	8	9	6	7	2	1	3	1	3	2	1	1	2				
Plague-infected rats		2		2	1	1	1			3	1			1				
Dutch East Indies.																		
Batavia and West Java	C	208	239	180	29	36	46	30	18	31	23	12						
	D	206	238	168	29	35	46	28	17	28	23	12						
East Java and Madura	C			4			1		1		1	2						
	D			4			1		1		1	2						
Java and Madura	D	557	615	427	89	108	99	80	65	81	68	63						
Egypt																		
Alexandria	C	4	3	1	1			1	1									
	D	1																
Plague-infected rats		3	1	1		1												
Assiout	C	9	7	26	9		17	15	6	10	1	1	5	16	8	3	4	5
	D	1	1	6	4		3	4		4	1	1		11	4	2	2	4

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths, P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931 14	21	28	March, 1931 7	14	21	28	April, 1931 4	11	18	25	May, 1931 2	9	16
Egypt—Continued.																		
Aswan	C	3																
Beni-Suef	C			1											10	2	3	
	D			1											3		1	
Cairo	C											1						
Deirout	C			21	6	10										3	7	1
	D			4		4										1	2	2
Gharbieh	C			1														
	D			1														
Girga	C		7	1						14	37	35	31	9	4		1	1
	D		2	1						2	5	17	13	3	5	1	1	1
Kena	C										5				3			
	D										2				1			
Manfalut	C		23	30	11		2	2	3	5	9							
	D		5	6	4		1			2	1							
Minieh	C	1		2						2	1			1			5	
	D			1						1	1						2	
Greece (see table below).																		
India	C	3, 259	3, 740	5, 335	1, 270	1, 095	1, 726	1, 366	2, 674	2, 271	2, 462							
	D	1, 856	2, 226	3, 422	862	774	1, 213	812	1, 887	1, 624	2, 009							
Bassein	C		2	4				1								1		
	D		1	3	1											1		
Bombay	C			1	1				1	1	1	1	4	4	1	2		
	D			1	1					2	1		4	4		3		
Plague-infected rats		32	38	34	14		8	10	17	14	21	18	34	43	30	30		
Calcutta	C												1	1				
	D												1	1				
Madras Presidency	C	148	220	312	30	19	13	12	9	12	7							
	D	78	154	182	17	18	7	4	4	12	5							
Rangoon	C		2	2							1		1				1	
	D		1	1							1		1				1	
Plague-infected rats		4	2	4		8						1	1	3				
Indo-China (see also table below): Pnompenh	C	6	1	7				1										
	D	6	1	7		1	2	1	2	1	1	2	2	1	1			
Iraq: Baghdad	C	4		5			1	2	1	3	3	1		5	10	8	7	10
	D	2		4				2		3	1	1		2	5	1	3	4

Madagascar (see also table below): Tamatave	C	4	2	9													
	D	3															
Morocco	C		19	13													
	D		8	4													
Nigeria: Lagos	C	9	5	1									2		1		
	D	9	5	1									2		1		
Plague-infected rats		5	5														
Peru (see table below).																	
Senegal (see table below).																	
Siam	C			4	5	9	3	1	2	2							
	D			2	4	6	4		1	1							
Bangkok	C	1	3	8	1	2	3		29								
	D	1	3	8		1	4		6								
Nagara Rajsima	C	11	17	9	7						1						
	D	9	10	10	6												
Syria: Beirut	C		1	1		1											
Tripolitania	C	13		8		1			1								
	D	1		3													
Tunisia: Tunis	C	P	13	1		9	2	3		5		5	5	7		4	
	D					7						4	4	2		2	
Union of Socialist Soviet Republics:																	
Gouranduz	D			28													
Transcaucasia—Karabakh	C			6													
Union of South Africa:																	
Cape Province	C	P															
Orange Free State	C		2	P	P	1	P		2		4						
	D		2			1					1						
On vessel: S. S. Marionga de Thermiotis at Avonmouth	C		1														

Place		Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931
British East Africa (see also table above)							
Kenya	C	58	62	50	69	21	7
Greece	C	2					
Indo-China (see also table above)	C	2	5	1			4
Madagascar (see also table above):							
Ambositra Province	C	4	44	95	100		
	D	4	44	87	96		
Antsirabe Province	C	3	18	27	66		
	D	3	18	26	57		
Miarinarivo Province	C	18	12	18	28		
	D	18	12	18	26		
Moramanga Province	C	20	19	13	7		
	D	20	19	11	5		
Tananarive Province	C	125	170	178	92		
	D	116	164	172	89		

Place		Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931
Peru	C	42	34	8			
	D	20	14				
Senegal:							
Baol [1]	C	53					
	D	35	4				
Louga [1]	C	37	10				
	D	25	3				
Rufisque [1]	C					2	
Thies [1]	C	24	27	2			
	D	15	23	1			
Tivaouane [1]	C	53	21	2			
	D	31	25	1			

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931			March, 1931				April, 1931				May, 1931		
					14	21	28	7	14	21	28	4	11	18	25	2	9	16
Algeria:																		
Algiers	C		1	1		1					2			2				
Bone	C			1														
Constantine	C									1								
Oran	C	3																
Arabia: Aden	C			1	1													
Belgian Congo	C		79	50														
Belgium	C				1													
Brazil:																		
Porto Alegre (alastrim)	C	36		3	1	1	2	3	7	12	16	14						
	D							1				1						
British East Africa (see also table below): Tanganyika	C	385	84	70	35	42	13	1	6	2								
	D	36	4	5		12	1		1	2								
British South Africa: Southern Rhodesia	C	18	18	3														
	D	3																
Canada:																		
Alberta	C	1	19	7	1													
British Columbia	C	1	3	2	1	2	5											
Manitoba	C			1			1											
Winnipeg	C		1				1											
Nova Scotia	C			1							1							
Ontario	C	23	17	49	10	4	7	8	2	3	3	1	4		6	7		
Kingston	C		6	1		1									2	3		
North Bay	C		2		1													
Ottawa	C	12	2	3		1												
Sault Ste. Marie	C		1	30			2						3	1				1
Toronto	C	4							1		1			4			1	
Quebec	C	2		2														
Saskatchewan	C	18		38	17	18	18	10	40	10	8		5	16	3	22		
Regina	C					1					2				2			
Canary Islands: Las Palmas	C										1							
China:																		
Canton	C				2			1	1	2	2	2	1	2	1			
Chungking	C	P	2															

Foochow	C	P	P	P		P		P		P		P						
Hong Kong	C		1	1	2	5		2			1	1		1	2			
	D				1	1	1				2				1			
Manchuria—																		
Harbin	C			1			4		1		1							
Kwantung—Dairen	C	4	1								2				1	1		
	D	1																
Nanking	C	P	P	P	P	P	P	P		P	P	P	P	P				
Shanghai—																		
Foreigners only	C	8	14	12	4	7	2	3	3	1	1	1	2	1	2	2		
Including natives	D	4	11	13	5	2	4	3	5	2	2	1	2	7	4	5		
Swatow	D	3	5	7		3	3	7	3	6	9	8	2					
Tientsin	C	2		1														
Chosen (see table below).																		
Columbia: Cali	D	1																
Dutch East Indies: Java—Batavia and West Java	C	6	4	29		2			1									
	D	2	2	2	1													
France (see table below)																		
Great Britain:																		
England and Wales	C	508	665	958	221	50	247	227	171	219	226	179	177	163	212	192		
Bradford	C	1	1	4		1				1		1	1		1	4		
Leeds	C		2									1		1	1			
London	C	184	161	149	23	16	23	36	26	54	32	35	51	39	84	53		
London and Great Towns	C	433	560	693	150	186	189	158	117	154	166	117	142	126	162	128		
	D	1				1									1			
Sheffield	C			3		16	6	10	2	1	6	1	4	2	1			
Stoke-on-Trent	C			1				1										
Greece (see table below)																		
Honduras:																		
Amapala	C							1										
Ocotepeque and Gracias districts	C							P										
Puerto Castilla	C		4	11	3													
Tegucigalpa	C														1			
Tela	C												1					
India	C	3,627	5,623	9,623	2,996	2,766	3,003	3,457	3,440	1,695	3,395							
	D	874	1,381	2,245	665	620	706	669	655	303	655							
Bombay	C	1	2	7		1	3	2	4	1	4	1	2	2	1	3		
	D	1	2	1		1	1	1		1	2	1	1			4		
Calcutta	C	18	59	143	35	51	83	82	53	69	75	86	101	60	61	65		
	D	11	40	100	26	41	66	55	36	54	50	63	73	42	50	54		
Cochin	C	22	15	29	19		16	24	15	17	14		10	11	12	6		
	D	4	1		1		1	1										
Karachi	C	3		3			4			3		1		5		1		
	D	1		2							2							
Madras	C	20	4	16	4	1	3	1	6	3	9	4	12	4	1	2		
	D	3				1				2	1		2	1	1	1		
Moulmein	C			2														
Negapatam	C	6											1	1		1		
Rangoon	C	1			2		1	1	1	1	1		2	2	1	6		
	D								1							1		
Vizagapatam	C			1			8		1		1		2	2	4	2		
	D						2				1		1		1			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931			March, 1931				April, 1931				May, 1931		
					14	21	28	7	14	21	28	4	11	18	25	2	9	16
India (French):																		
Chandernagor	C		5	9	2		6	6	3	3	6	2						
	D		3	1			1					2						
Karikal	C		3	5	2		16	1			3							
	D		2	4	2		16											
Pondicherry Province	C	19	34	45	1	1	10	7	7		4	3	3			3		
	D	17	32	45	1	1	10	7	7		4	3	3	3		3		
India (Portuguese)	C		4	5	2	3	6	3		3	5							
	D				2		1			1	2							
Indo-China (see also table below):																		
Pnompenh	C	1	2	1					1									
	D	1		1														
Saigon and Cholon	C	2		6		2	2		4	1	1	2	1					
	D	2		4			1		3	1	2	2	1					
Iraq:																		
Baghdad	C						3	6										
Mosul Liwa	C	16	1	3		5												
	D	2				1												
Ivory Coast (see table below).																		
Japan:																		
Kobe	C						1	1										
Taiwan	C			1														
Mexico (see also table below):																		
Jalisco (State)—Guadalajara	D	3		1							1					1	1	
Mexico City and surrounding territory	C	6	10		7	5		11	13	13	7		17	9				
	D	6	6	1	1	3	2	2	5	5	6	6	4	6				
Torreon	C													1				
	D													2				
Vera Cruz	C				1		1	1		1	1			1		1	1	
Morocco (see table below).																		
Nicaragua: Porto Cabezas	C		2															
Nigeria: Lagos	C										2							
Panama Canal Zone	C			2														
Poland	C	3	25			1												

Portugal: Lisbon	C	37	72	103		12	19	9	16	15	17	4	8	18	11	19		
Siam	C		1	4	1	1												
Somaliland, British: Boales	C	1																
	D		1															
Spain	C	P	P	P	P	P	P	P	P	P	P							
Straits Settlements	C	17	6	7			2				2	1	1		1			
	D	7	3	1			1				1		1	1				
Sudan (Anglo-Egyptian)	C	50	64	11	1	1	44	51	3	1	4					3		3
	D	5	6	7			6	4		1	1							
Sudan (French) (see table below).																		
Syria (see table below).																		
Tunisia: Tunis	C		17	8							4							
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P				P			P							
Orange Free State	C	P		P			P	P			P							
Transvaal	C	P	P	P	P	P	P	P	P		P							
Upper Volta	C	6	4			8	10				3			3				
	D		2								1							
On vessel:																		
S. S. Clan Mactoggart at Suez	C				2													
S. S. Muncaster Castle at Manila from Hong Kong	C		1															
S. S. Matheran at Suez from Calcutta	C			1														
S. S. Clan Buchanan at Suez	C						2											
S. S. Rotterdam at Naples from Venice	C										1							
S. S. Clan McTavish at Manila from Chittagong	C													1				
S. S. Benvenue at Sydney from Shanghai	C			1														
S. S. Clan MacBrayne at Cochin	C				1													
S. S. Chilka at Rangoon	C					1												
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C															1		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931
British East Africa (see also table above):							
Kenya	C		653				
Chosen	C	22			1		11
	D	6			1		3
France	C					16	

Place		Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931
Greece	C			4		4	
Mexico (see also table above)	D	893		1		3	
Morocco	C	4	20	25		4	6
Turkey	C	74	65	116		37	1
	D	1	1	9		6	

Place		October, 1930	November, 1930	December, 1930			January, 1931			February, 1931			March, 1931		
				1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-28	1-10	11-20	21-31
Indo-China (see also table above)	C	258	86	38	9	14		48	46		46				139
Ivory Coast	C	4	2	9											
Sudan (French)	C	17		43		96							4		P
	D	2		16		4									
Syria: Beirut	C							1							

TYPHUS FEVER

Place		Oct. 19-Nov. 15, 1930	Nov. 16-Dec. 13, 1930	Dec. 14, 1930-Jan 10, 1931	Jan. 11-Feb. 7, 1931	Week ended— February, 1931			March, 1931				April, 1931				May, 1931	
						14	21	28	7	14	21	28	4	11	18	25	2	9
Algeria:																		
Algiers	C	1	2			1	1					3				2		
Constantine Department	C	1	2	6	31			4			1		2	2		6		
Oran	C		5		3				1							1		
Australia; western	C												1					
Bulgaria	C	3	11	3	13		2		3				9		26			
	D			1									2		3			
Chile: Valparaiso	D										1							
China:																		
Canton	C				2					1								
Manchuria—Harbin (see also table below)	C		1		3			5										
Shanghai	C				2													
Tientsin	C		1											1				

Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C	2	2												1			
	D	2																
Beheira Province	C			1										3				
	D			1										2				
Cairo	C		1	1	1													
Port Said	C	2			1													
Eritrea: Asmara	C									1								
Great Britain: Scotland	C				1													
Glasgow	C				2													
	D				1													
Greece (see table below).																		
Guatemala.[1]																		
Iraq: Baghdad	C					2	1	1	1	1								2
	D					1												2
Irish Free State: Mayo County—Belmullet	C														1			
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico (see also table below).																		
Durango	D				1													
Mexico City, including municipalities in Federal District	C	11	14	12	39	13	13	9		46	66	73	31	67	34			
	D	4	7	10	34	4	7	5		20	13	31	20	18	7			
San Luis Potosi	D		2			2	2		1	1	1	2	1	1	2			
Morocco	C	3	1	8	8	7	8	5	8	2	2	3			1		12	
	D				2		1										1	
Palestine	C	3	7	4	2	3				2	1	1	1	1	2		2	2
Paraguay: Asuncion	D				4													
Poland	C	37	42	63	106	49	41	43	56	62	58	85	82	93	176	140	129	
	D		7	3	8	3	3	4	9	4		7	4	8	7	6	7	
Portugal: Oporto	C	4	6		1													
Rumania	C	41	34	113	193	49	53	12	38	55	53	52		70				
	D	2	3	5	16	5	11	3	5	4	5	3		8				
Spain	C	4	1															
	D		1															
Tunisia:																		
Sbeitla, vicinity of	C												20					
	D												7					
Sfax	C											2						
Tunis	C		28		16			6	12	5	2	7		2			10	
Turkey (see table below).																		
Union of South Africa.																		
Cape Province	C	P	P	P	P	P	P	P	P	1		P						
Municipality of East London	C	1	1	3	3							P						
Natal	C	P		P	P	P	P				1	P						
Orange Free State	C	P		P	P	P		P	P	P								
Transvaal	C	P	P	P	P	P	P	P	P	P		P						
Yugoslavia (see table below).																		

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reports an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931
China: Harbin (see also table above)	C	3					
Chosen: Seoul	C	7	1	1	1		3
Czechoslovakia	C		16	24	60		
Greece	C	4	4	10	10	17	8
	D				2	2	1
Latvia	C					12	
Lithuania	C	1	5	6	26	3	22
	D		1	3	3	1	2
Mexico (see also table above)	D	47	47	47			
Turkey	C	28	3	2		18	
Yugoslavia	C	2	2	1	20		
	D	1		1	2		

YELLOW FEVER

	Cases	Deaths
Brazil:		
Bahia State—		
Mar 14, 1931	1	
Mar 15-21, 1931	1	
Ceara State—Mar. 14, 1931	2	
Barbalha, Feb 7, 1931	1	1
Minas Geraes State—		
Mar. 20, 1931	2	
Apr. 5-11, 1931	1	
Apr. 19-25, 1931	2	1
Apr. 26-May 2, 1931	2	1
May 3-9, 1931	1	1
Brazil—Continued.		
Rio de Janeiro State—		
Mar. 7, 1931	1	1
Mar. 14, 1931	1	1
Mar 21, 1931	1	1
Cambucy—		
Jan 1-25, 1931	3	3
Feb. 1-7, 1931	1	1
Friburgo (imported), Jan. 25-30, 1931	1	
Padua—		
Jan. 18-24, 1931	1	1
Feb. 1-7, 1931	1	1
Feb. 8-14, 1931	1	
British Cameroon: Mamfe, May 14, 1931	3	1

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UNITED STATES TREASURY DEPARTMENT

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JUNE 5 - - - - - 1931

SPECIAL ARTICLES

Sanitation and Yellow Fever Control in Liberia, 1930

Venereal Disease Among Coast Guard Enlisted Personnel

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of public health.

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PUBLIC HEALTH REPORTS

VOL. 46 JUNE 5, 1931 NO. 23

RÉSUMÉ OF REPORT ON SANITATION AND YELLOW FEVER CONTROL IN LIBERIA

By H. F. SMITH, *Surgeon, United States Public Health Service*

As a result of the death of the American minister to Liberia and the deaths of several other American and European residents in Monrovia during the year 1929, the American, British, French, and German Governments by common agreement made joint representation on the subject to the Government of Liberia. Later, following a memorandum agreement between the Government of the United States and the Government of Liberia, an officer of the United States Public Health Service was detailed to act as chief medical adviser to the President of that Republic.

Under the terms of this memorandum agreement, the officer detailed to act as chief medical adviser was to make health investigations and surveys and institute corrective sanitary measures not contrary to the organic and statutory laws of Liberia, and was made directly responsible to the Liberian President. The Liberian Government agreed to furnish the chief medical adviser with ample police assistance and to provide certain sums of money with which to carry out the proposed work. For this latter purpose the Liberian Legislature appropriated $18,000 for the year beginning January 1, 1930. The agreement also provided that the officer detailed from the United States Public Health Service should submit a report regarding health conditions in Liberia, with recommendations as to the permanent sanitary improvements and organization which conditions might require, and the Liberian Government agreed that the measures so recommended would be undertaken and effected as early as practicable, in so far as they were economically feasible and were not contrary to the organic and statutory laws of Liberia.

The writer, detailed as chief medical adviser, arrived in Monrovia, the capital of the Republic of Liberia, on January 20, 1930, and, after formal presentation to the President and other Government officials, took up his duties on January 25, 1930.

It soon became evident that the officials of the Liberian Government were not in sympathy with the proposed program relating to

yellow-fever control, and many of them quite openly expressed their disbelief even in the existence of such a disease as yellow fever.

At the beginning of operations there was no trained sanitary personnel in Liberia. It was therefore necessary to select from approximately 150 untrained applicants sufficient men to form the nucleus of an inspectors' corps. Eight of the most promising applicants were chosen and were given an intensive although rather elementary course in matters pertaining to the work in hand. Considerable difficulty was experienced in securing control over this personnel as the President insisted that they be granted "commissions," under which the employee became subject to discipline and supervision only by the President. As the control of procedure and personnel in work relating to epidemic diseases must be vested in the person responsible for the success of the enterprise, such a procedure of "commissioning" employees could not be agreed to; and on February 27, after several conferences and considerable delay, the chief medical adviser was given power to appoint and control the personnel engaged in sanitation work.

The President was finally persuaded to issue an Executive order requiring all physicians and also the so-called "bush" doctors to report to the chief medical adviser all cases of fever of 100° F. or over. This was requested in order that all cases of fever within the city could be visited by a representative of the chief medical adviser's office to determine whether or not cases of yellow fever were occurring within the city. There was considerable opposition to the issuing of this Executive order, based on what was thought might be considered a reflection on the local physicians' ability to diagnose such a disease as yellow fever. Owing to lack of sympathy with the work, it was found impossible to enforce this Executive order.

Actual field work was finally started on March 5, 1930. This work embraced a house-to-house survey of each and every building and building lot in the city. The necessary survey cards had in the meantime been drafted and printed. These cards embraced data relative to the location of the premises, name of occupant, census of the occupants as to age, sex, and nationality, and the presence or absence of wells, cisterns, water barrels, tin cans, bottles, roof gutters, pools, or depressions, type of vegetation, etc., and also data as to whether or not wells, cisterns, and other water containers were protected against mosquito breeding, and as to whether or not breeding was actually taking place on the premises at the time of inspection. Information was also obtained as to the method of disposal of human excreta on each of the premises inspected.

In order that active mosquito control might be effected as early as possible, each inspector was furnished a sufficient number of laborers

to cut all weeds and to collect and remove from each city lot or premises all tin cans, bottles, and other types of refuse which might act as breeding places for mosquitoes during the rainy season. As a result of these activities, five hundred and forty-six 2-ton truck loads of tin cans, broken bottles, and similar refuse were removed from the city and disposed of during the course of the survey.

In March, 1930, the services of a trained public health nurse conversant with yellow fever and its symptoms were secured, and an infant welfare clinic was opened the latter part of that month. The number of children brought to the clinic increased weekly up to the time it had to be closed owing to the lack of funds. To this public health nurse was also delegated the duty of visiting the few cases which were reported to the chief medical adviser by local physicians as having a temperature of 100° F. or over. All cases the least suspicious of yellow fever in the opinion of the public health nurse were immediately visited by the chief medical adviser.

The work of the preliminary survey and the initial clean-up of the city occupied the time from March 5 to May 20. During this period a vast difference was made in the general appearance of the city. The death rate for the month of May was reduced by more than 75 per cent as compared with the rate for the corresponding month of any preceding year.

From the beginning of the work difficulty was experienced in having the expenses met and liquidated, and it was necessary on three occasions between February 1 and May 30 to discontinue practically all operations, owing to the fact that funds could not be had for the payment of salaries and the purchase of equipment.

Difficulty was also experienced in taking the census and in making the preliminary survey, although the law provided a penalty for interference with the inspectors in the performance of their official duties. During the entire time the work was in progress, support from the courts in connection with the enforcement of sanitary regulations as provided in the agreement was lacking.

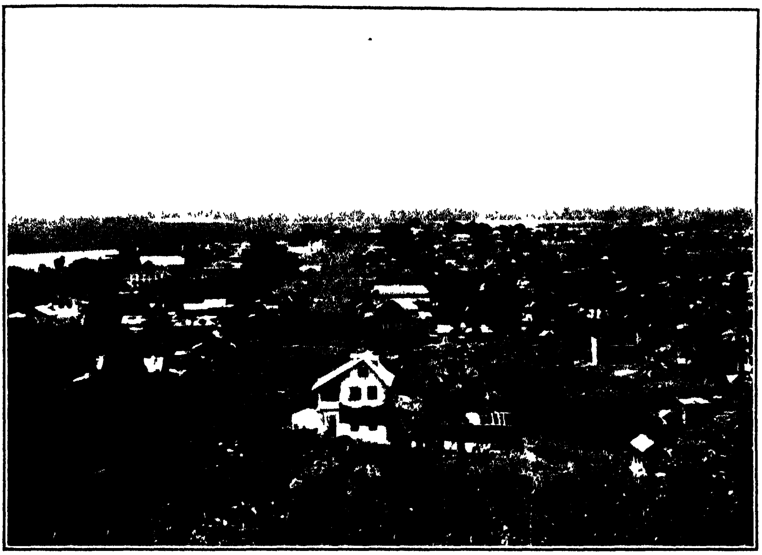
On May 26, 1930, the chief medical adviser received notice from the auditor, confirmed the following day by the secretary of the treasury, to the effect that there were no further funds available for the continuation of the special sanitation work, although at the time this notice was received only $4,707 of the appropriation of $18,000 had been obligated, and of this amount $977 still remained unpaid. The total amount that had been paid out of the original $18,000 was $3,730. In view of the fact that no further funds were made available from the remainder of money appropriated, it was necessary to stop all operations and discontinue the services of all personnel, except those of the public health nurse, on May 31.

The data collected during the survey were compiled and a report on the conditions found was prepared. The report embraced the following subjects: History, geographical conditions, climatic conditions, rainfall, object and scope of survey, method of procedure, population, housing conditions, water supply, sewage disposal, garbage and refuse, vital statistics, communicable diseases, mosquitoes, mosquito breeding, public-health activities (national), public-health activities (municipal), and maritime quarantine. This report also presented the conclusions drawn from the actual findings as shown by the survey cards and the specific recommendations relative to the corrective measures which should be instituted.

On June 3 the first-known case of yellow fever in Monrovia for the year 1930 was reported by one of the two European physicians in the city. The case was unquestionably an imported one as the patient had been in the city but eight hours when taken sick and had been absent from the city for a period of over 10 days prior to the onset of the disease Upon a diagnosis of yellow fever being made, the family of the patient immediately discontinued the services of the European physician attending the patient and employed a native doctor. The case proved fatal three days after it had been reported Examination of the burial permit at the close of the month showed that the cause of death as given by the local doctor was "strangulated hernia." Every house within a distance of two city blocks in all directions from the residence of this patient was visited daily for a period of five weeks Every person in this area was seen or accounted for daily during this period No secondary cases occurred.

Unsuccessful efforts were made by the chief medical adviser to secure from the municipal board permission to examine mortality records, and it became necessary to appeal to the President for permission to examine the city burial permits. The examination of such permits was permitted by the municipal board from May 1 until September 1, after which date the board again refused permission to examine the records or furnish any data relative to the number of deaths occurring in the city. Permission could not again be secured to inspect the city's mortality records.

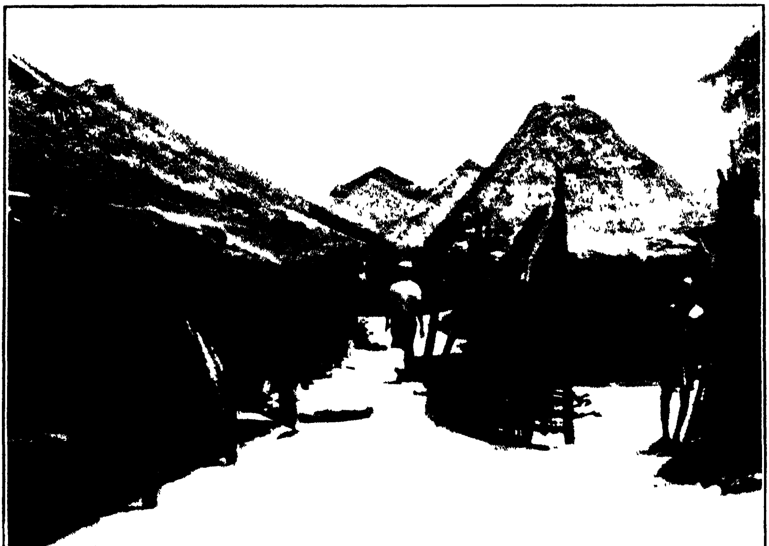
Fruitless appeals were made for the balance of the money appropriated by the legislature to carry on the work, and upon the specific recommendation of the financial adviser, the Finance Corporation of New York agreed to make available the sum of $11,000 for a continuation of the sanitary program in Monrovia. It was recommended by the chief medical adviser, however, that this money be not made available until the Liberian Government agreed to give its cooperation and support to the sanitary program, and as evidence of this sympathy and support the President was requested to agree to the following program:



RESIDENTIAL SECTION OF MONROVIA PROPER

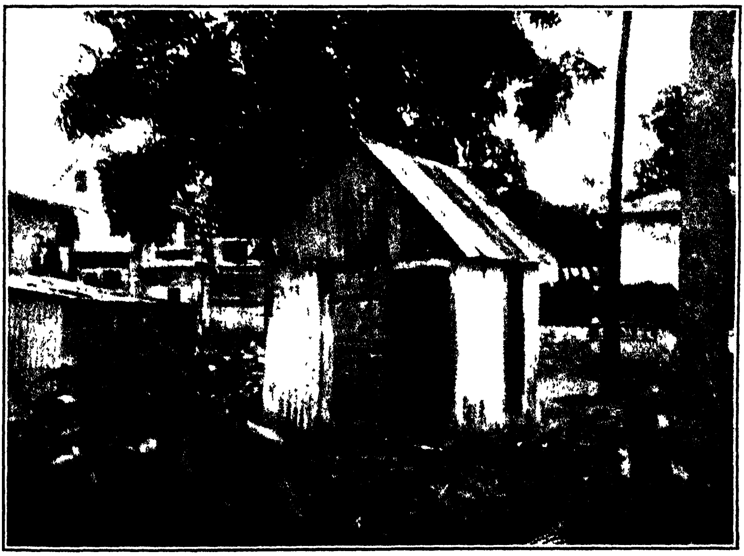
BROAD STREET, THE MAIN THOROUGHFARE AND BEST RESIDENTIAL SECTION OF MONROVIA PROPER

KROOTOWN, OR NATIVE QUARTER OF MONROVIA



A STREET IN KROOTOWN

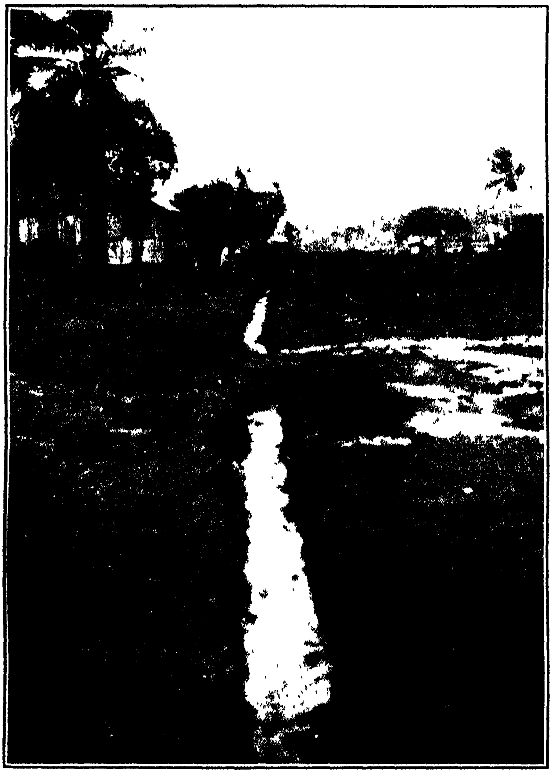
BEST TYPE OF MONROVIAN WELLS



BEST TYPE OF MONROVIAN PRIVIES

REFUSE COLLECTED FROM TWO BACK YARDS

More than 500 truck loads of this type of refuse were collected and removed during the survey.



SAMPLE OF DITCHES CONSTRUCTED IN CONNECTION WITH ANOPHELES CONTROL

1. That the sanitary inspectors should be given police authority in all matters pertaining to their sanitary duties.
2. That all cases of violation of the sanitary regulations should be tried in a special sanitation court, such a court to be authorized by the President.
3. That the judge of such a court be named by the chief medical adviser and two disinterested Liberian citizens.
4. That the $11,000 advanced be subject to expenditure only over the signature of the chief medical adviser.

Although agreement was secured to the above-listed requirements, Executive orders in consonance with such requirements failed to be forthcoming, and after further evidence of the lack of governmental sympathy with the program, it was deemed inadvisable to expend any portion of the $11,000 advanced by the Finance Corporation, and especially so since this money had been made available on the specific condition that the Government comply with the above-enumerated requirements.

The following is a summary of the report presenting the findings, conclusions, and recommendations:

Geographical and climatic conditions.—The geographical location and climatic conditions are ideal for the propagation of *Aëdes* mosquitoes throughout the year.

Rainfall.—There appeared to be a definite relationship between the amount of rainfall and the mortality. In all probability this increase in the number of deaths is related to the increase in the incidence of *Aëdes* breeding, such breeding being greatly increased by the lack of any system of refuse collection. Average annual precipitation is 160 inches, practically all of which falls between April and November.

Housing conditions in the native quarter were such as to constitute a hazard to the health of the community generally.

Water supply was found to be inadequate and unsafe. A protected water supply should be one of the first public utilities to be installed when funds are available.

Sewage disposal.—The method of disposal of human excrement was found to be a menace to the health of the community and should be corrected.

Vital statistics.—There were practically no vital statistics, and those which were kept did not portray a true picture of conditions. Legislation or regulations governing the collection of vital statistics should be enacted.

Mosquitoes and mosquito control.—Ninety-six per cent of the premises inspected in the city proper during the survey were found to be breeding mosquitoes at the time of inspection. Experiments showed that 94 per cent of the mosquitoes hatched from specimens taken

from such premises were of a species capable of transmitting yellow fever. Conditions favoring the spread of yellow fever by mosquitoes should be eliminated.

Public-health activities—National.—Public-health legislation is far from adequate. There are no organized activities.

Public-health activities—Municipal.—Municipal public-health control measures were inadequate. The lack of organization had resulted in inadequate and ineffectual efforts to control conditions governing the conservation of health.

Maritime quarantine.—Legislation and regulations under law, both national and municipal, are, according to modern standards, inadequate and fail to provide the protection available through properly applied methods.

Yellow fever.—From information gained from physicians practicing in Monrovia, from the examination of such death records as were available, from conversation and interviews with persons who had previously had yellow fever while living in the city, from the known number of deaths occurring from that disease in the city which were not recorded in the local mortality records, and from the report of the representative of the West African Yellow Fever Commission, it was concluded that yellow fever had existed in Monrovia over a considerable period of time. With the lax methods of mortality reporting and with the absence of diagnosis in over 50 per cent of all deaths which were recorded, it was impossible to estimate the actual number of deaths from this disease occurring in the city. The activities which had been conducted concurrently with the survey aimed solely toward the correcting of conditions which favored the presence and spread of yellow fever, i. e., the control of mosquito breeding in and about human habitations.

After 10 weeks of such control measures, which period included the month (May) which heretofore had had the highest mortality of the year, it was found that the number of deaths for this particular month had been reduced over 75 per cent as compared with any previous corresponding month on record. As all other local factors including meteorological conditions for the month had remained practically unchanged as compared with the corresponding month of previous years, it was assumed that the reduction in the number of deaths during the month had been the result of the measures employed toward mosquito control.

If, then, those measures which bore directly on conditions relating to the control of yellow fever resulted in a reduction of over 75 per cent in the total mortality during a period in which occurred in previous years a number of deaths known to be due to yellow fever, and no known cases nor any known deaths from that disease occurred

after the inauguration of the measures above mentioned, it might be assumed that the marked increase in the number of deaths which had heretofore occurred periodically at that particular time were, in the absence of any diagnosis, due to yellow fever. This assumption was strengthened by the belief that, had the undiagnosed deaths which were known to have occurred at this time in previous years been actually due to yellow fever, the measures which had been instituted would unquestionably have resulted in a decrease in the mortality similar to that which actually occurred.

A continuation of the special sanitation program, together with the adoption of the recommendations embodied in the report, was urgently recommended.

Unless active measures should be constantly enforced, mosquito control, which had been demonstrated during the survey to play a most important rôle in the control of the community death rate, could not be made effective. Mosquito control in the city on May 31, 1930, was well in hand. Delay in the continuation of such control meant the loss of the advantages then held and a return of the death rate to its old level. To regain control of mosquito breeding at a later date would necessitate also an added increase in expenditures. Continued efforts, constant vigilance, and rigid enforcement of the sanitary regulations were shown to be the only means of safety.

This report was submitted to the President of Liberia on June 2, 1930, but no acknowledgment of its receipt was received from the Liberian Government, and no effort was made to carry out the corrective measures recommended even when funds were made available.

In this work the Government of the United States, through the officer of the United States Public Health Service appointed to act as chief medical adviser to the Republic of Liberia, carried out its obligations to the Liberian Government as set forth in the memorandum agreement; but, unfortunately, it became necessary to discontinue operations owing to the failure of the Liberian Government to provide funds and court assistance as provided for in the memorandum agreement. It is felt, however, that the value of such sanitary work was amply demonstrated by a reduction in deaths in Monrovia equivalent to the saving ot 132 lives per year even by this brief application of sanitary measures, and that the experience and results set forth in this report are worthy of consideration when future plans for organization and appropriation for public health and sanitation activities shall be contemplated.

VENEREAL DISEASE AMONG COAST GUARD ENLISTED PERSONNEL DURING THE FISCAL YEAR 1930

By W. W. King, *Medical Officer, United States Coast Guard Headquarters; Medical Director, United States Public Health Service*

The following report is supplemental to that for the fiscal year 1929, published in the Public Health Reports for December 5, 1930, in which a general review was made of the study of venereal disease conditions in the Coast Guard since 1927, the first year for which a record had been kept.

The data for 1928 showed a marked improvement over the conditions for 1927, and this improvement continued through 1929. The record for 1930, however, shows that the improvement suffered a reverse in several respects during that year, and this report is submitted in the belief that those interested should be informed of the conditions, especially Public Health Service and Coast Guard officers who deal directly with the situation.

In Table 1 are included all cases of each disease reported during the fiscal year ended June 30, 1930, including those carried over from the previous year, together with the data for prior years. The carried-over cases were considerably greater in number than those carried over in 1928 and 1929, and they account for nearly one-third of the total increase of 109 cases. This is one consequence of the policy of retaining a venereal-disease patient in the Coast Guard if there is hope of his restoration to duty within a reasonable time, or if he can be treated without being a menace to his shipmates and without undue loss of time from duty.

The average number of enlisted personnel of the Coast Guard during the year was 10,834, an increase of 142. These additional men were potential venereal disease patients, but at the 1929 rate would not have added more than 12 cases. The rate of incidence for all cases of venereal disease increased in 1930 to 91.10 per 1,000 over the 1929 rate of 82.12. The carried-over cases have evidently influenced the increase in rate as well as the increase in the number of cases.

The number of new cases reported in 1930 was 834, an increase of 75, the rate increasing from 70.98 in 1929 to 76.98 in 1930, as shown in Table 2.

Table 1.—*Number of cases reported, and rate per 1,000*

	1927		1928		1929		1930	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Gonorrhea	764	78.36	677	66.23	645	60.33	656	60.55
Chancroid	86	8.82	116	11.17	65	6.08	95	8.77
Primary syphilis	65	6.66	54	5.20	50	4.68	80	7.38
Late syphilis	115	11.80	110	10.60	118	11.03	156	14.40
Total	1,030	105.64	957	92.21	878	82.12	987	91.10

TABLE 2.—*New cases reported, and rate per 1,000*

	1927		1928		1929		1930	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Gonorrhea	719	73.71	590	56.85	565	52.84	562	51.87
Chancroid	86	8.82	111	10.70	60	5.61	88	8.12
Primary syphilis	60	6.15	50	4.82	48	4.49	72	6.65
Late syphilis	98	10.05	78	7.52	86	8.04	112	10.34
Total	963	98.77	829	79.88	759	70.98	834	76.98

The cases were tabulated and the incidence rates were calculated under four heads, viz, gonorrhea, chancroid, primary syphilis, and late syphilis. The statistics for each group compared with those of the same group for 1929 show some interesting facts.

The gonorrhea group comprises about two-thirds of the venereal cases and is the group in which the greatest increase in the number of cases might be expected. On the contrary, this group for 1930, counting all cases, amounted to 656, an increase of only 11 cases, while the new cases were 562, a decrease of 3 cases as compared with the 1929 figures. Carried-over cases explain the increase among all cases.

The number of chancroid cases has varied greatly each year. In 1930 there were 95, as compared with 65 in 1929, counting all cases. Of new cases there were 88 in 1930, as compared with 60 in 1929. Thus there was a large actual increase, because the carried-over cases would account for but a small number. It was a bad year for chancroid infection.

It was equally bad for primary syphilis. The 1930 figures showed 80, all cases, as against 50 in 1929, and 72 new cases in 1930 as against 48 in 1929, increases of 30 and 28 cases, respectively.

The increases in the numbers of cases in these two groups constitute about one-half of the total increase, and are those for which a probable explanation may be most easily assigned. In view of the fact that the prophylactic use of calomel ointment gives the best results in the prevention of such cases, it seems probable that their increased number was due to neglect of that preventive measure.

In 1930 the last group of cases, those of late syphilis, numbered 156 in all, of which 112 were new cases, as against 118 and 86 in 1929. These cases fall into three classes: (1) New cases in which infection took place comparatively recently but which did not come to attention during the primary stage. The information at hand is insufficient to estimate the number in each class, but apparently this one is fairly numerous and probably has increased in 1930 for the same reason given in the last paragraph. A second class, (2) new cases in which infection took place a long time ago, and which are more or

less in a latent stage, the diagnosis being made usually as the result of a positive Wasserman reaction. This class seems relatively small. The third class, (3) old cases carried over from the previous years, is probably the largest of the three and accounts for a considerable proportion of the increased number of cases in this group.

An analysis of the data thus indicates that the adverse showing for 1930 is not as bad as might seem at first glance. Approximately one-half of the increased number of cases may be charged to the policy of retaining patients in the service under circumstances in which they were formerly discharged for physical disability. The remainder of the increase in cases constitutes an actual increase, apparently due to failure to apply a simple preventive measure of known efficacy.

It would be giving an incomplete picture of the venereal disease conditions to ignore the cases reported under the diagnosis "urethritis" or "ulcer." They can not be included in the four groups above mentioned because of the impossibility, with the information available, of separating those which are venereal from those which are not. Undoubtedly a considerable proportion are of venereal origin. It may be remarked here that many of these cases are reported as "nonvenereal" when "nonspecific" is apparently the sense intended. The two words have distinct meanings but are mistakenly used at times as synonyms.

This group of indefinite cases showed a decided increase in the number of cases of urethritis, 74 in 1930 as against 50 in 1929. This increase makes the showing of the gonorrhea group less favorable if, as seems probable, a considerable proportion of these cases may be considered as undiagnosed gonorrhea. Thirteen received hospital treatment totaling 275 days, and two were off duty 28 days but not in hospital.

The cases of ulcer were the same in number, 13, as in 1929. Three received a total of 25 days in hospital.

Cases of more than one disease in the same patient were divided in two classes as shown by Tables 3 and 4.

TABLE 3.—*Mixed infections*

Treated at the same time for—	1927	1928	1929	1930
Gonorrhea and primary syphilis	5	5	4	4
Gonorrhea and late syphilis	15	21	10	18
Gonorrhea and chancroid	10	10	3	5
Gonorrhea, chancroid, and primary syphilis	0	4	1	0
Gonorrhea, chancroid, and late syphilis	2	0	2	1
Chancroid and primary syphilis	2	9	2	5
Chancroid and late syphilis	3	3	8	4
Total	37	52	30	37

TABLE 4.—*Reinfections*

Treated at different times for—	1927	1928	1929	1930
Gonorrhea and primary syphilis	3	0	4	7
Gonorrhea and late syphilis	1	0	3	6
Gonorrhea and gonorrhea (apparent reinfection)	0	1	5	4
Gonorrhea and chancroid	3	7	5	6
Gonorrhea at one time, chancroid and primary syphilis at another time	0	0	1	0
Gonorrhea at one time, chancroid and late syphilis at another time	1	0	0	0
Chancroid and chancroid (apparent reinfection)	0	3	0	0
Chancroid and primary syphilis	0	1	1	3
Chancroid and late syphilis	1	4	0	12
Chancroid at one time, gonorrhea and late syphilis at another time	0	0	0	1
Total	9	16	19	39

The number of patients treated for more than one venereal disease at the same time was 37, an unimportant increase of 7 cases. The number of those treated for more than one disease but at different times increased from 19 to 39, chiefly those having late syphilis who had acquired another disease. As many cases of late syphilis are carried over from previous years, it is not surprising that this occurs.

Each disease is recorded in its group; and since one man may have more than one disease, it follows that the number of men affected was less than the number of cases. There were 927 men affected in 1930, an increase of 103, and a corresponding increase in the percentage of men affected from 7.7 to 8.6.

The number discharged primarily on account of physical disability due to venereal disease (Table 5) decreased from 67 to 45, but the number of men with venereal disease discharged for undesirability and other reasons (not including expiration of enlistment) increased from 16 to 37. Therefore the net result was but slightly changed.

TABLE 5.—*Discharges for physical disability due to venereal diseases*

	1927	1928	1929	1930
Gonorrhea	302	89	57	33
Chancroid	18	1	1	3
Primary syphilis	27	4	1	3
Late syphilis	39	15	8	6
Total	386	59	67	45

The number of hospital patients (Table 6) increased by 67, from 581 to 648, and there was a corresponding increase of 1,974 hospital days, from 22,150 to 24,124. The average number of hospital days per patient decreased from 38.12 to 37.23, which may be regarded as within normal variation, although it represents a saving of 577 hospital days as compared with the number of hospital days which would have occurred had the 1929 rate prevailed.

TABLE 6.—*Hospital days*

	Number of patients				Hospital days				Average number of days per patient			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
Gonorrhea	551	521	[1]452	477	13,943	20,437	17,109	18,559	24.85	39.23	37.85	38.91
Chancroid	57	80	53	61	1,399	2,371	1,784	1,717	24.54	29.64	33.66	28.15
Primary syphilis	50	34	[2]31	53	1,566	1,319	1,263	1,072	31.52	38.79	40.68	31.55
Late syphilis	56	56	45	57	1,598	1,787	1,994	2,176	28.54	31.91	44.31	38.18
Total	714	691	581	648	18,506	25,914	22,150	24,124	25.92	37.50	38.12	37.23

[1] Including 3 patients discharged from the Coast Guard before the beginning of the year but remaining in hospital. These patients are included also in Table 7.
[2] Including 1 patient discharged from Coast Guard before the beginning of the year but remaining in hospital. This patient is included also in Table 7.

Patients remaining in hospital after discharge from the Coast Guard numbered 30, a marked decrease from the 90 in 1929. The number of hospital days after discharge decreased from 1,125 to 362, and the average number of hospital days per patient from 12.50 to 12.07. (Table 7.)

TABLE 7.—*Cases in hospital after discharge from Coast Guard*

	Patients				Days				Average days per patient			
	1927	1928	1929	1930	1927	1928	1929	1930	1927	1928	1929	1930
Gonorrhea	200	75	72	23	2,411	493	668	234	12.05	6.57	9.28	10.17
Chancroid	17	2	4	3	365	27	53	17	21.47	13.50	13.25	5.67
Primary syphilis	19	6	2	1	257	77	259	2	13.53	12.83	129.50	2.00
Late syphilis	17	17	12	3	255	178	145	109	15.00	10.47	12.08	36.33
Total	253	100	90	30	3,288	775	1,125	362	13.00	7.75	12.50	12.07

These days in hospital after discharge from service do not represent time lost to the Coast Guard; but a number of other patients who were not in hospital were off duty on account of venereal disease, and this time was lost to the Coast Guard. It amounted to 414 days, as against 909 days in 1929. Added to the number of days in hospital of men in service, it makes a total of 24,176 days' time lost to the Coast Guard in 1930, an increase of 2,242 over the same item for 1929. (Table 8).

TABLE 8.—*Days off duty while in Coast Guard*

	1927	1928	1929	1930
Gonorrhea	12,228	20,123	17,190	18,642
Chancroid	1,066	2,373	1,773	1,703
Primary syphilis	1,317	1,242	1,090	1,688
Late syphilis	1,362	1,628	1,881	2,143
Total	15,973	25,366	21,934	24,176

The increase in the number of hospital days represents a loss to the Public Health Service, and the increase in off-duty days represents a corresponding loss to the Coast Guard. About one half of these losses may be regarded as normal to certain circumstances as being the result of matters of policy and other factors, but the other half may be considered an absolute loss in that it apparently might have been prevented.

Notwithstanding the increase in the number of cases, the number of admissions and readmissions to off-duty status was slightly decreased from a monthly average of 56 to 54.75. This is not inconsistent with the increase in the number of hospital patients, the difference being made up by cases carried over while on off-duty status, having been admitted during the preceding year. The monthly average of admissions and readmissions indicates the approximate number of men off duty at all times on account of venereal disease.

Other data were included in the 1929 report, but as the figures for 1930 on the same points do not show any change of material interest it has not been thought necessary to discuss them.

TEMPORARY INJUNCTION AGAINST PASTEURIZATION REQUIREMENT DENIED BY TRIAL COURT

An ordinance of the city of Winona, Minn., prohibited the distribution or delivery of milk within the city, except for manufacturing or cooking purposes, unless the milk had been pasteurized. In an action in which it was contended that the pasteurization requirement was an unwarranted and unlawful burden upon interstate commerce to the extent that it prohibited the delivery from Wisconsin in interstate commerce of unpasteurized milk to persons within Winona, the district court in Winona County denied the plaintiff's motion for a temporary injunction, accompanying such denial with the following memorandum opinion:

MEMORANDUM

The ordinance under consideration prohibits the distribution or delivery of milk within the city of Winona, except for manufacturing or cooking purposes, unless such milk has been pasteurized. Plaintiff contends that this requirement "to the extent that it prohibits the delivery from Wisconsin in interstate commerce of unpasteurized milk and cream to persons within the city of Winona is an unwarranted and unlawful burden upon such commerce."

The court recognizes the validity of the general principles of law set forth in the scholarly brief submitted by plaintiff's counsel. The arguments of counsel, however, are founded upon the premise that "raw milk" as such is a legitimate and well-recognized article of commerce, that it is a wholesome food substance, and that the ordinance wholly prohibits its importation into the city.

The court is of the opinion that while the term "raw milk" may sometimes be appropriately used in contradistinction to "pasteurized milk," no such dis-

tinction is justified in stating the premise of this argument. Pasteurized milk, regarded as an article of commerce and of food, has substantially the same properties and is used for substantially the same purposes as unpasteurized milk—both are in fact raw milk. It is only in the realms of hygiene and pathology that any substantial distinction exists.

When milk is actually boiled, or evaporated, or when it is converted into butter or cheese, a distinctly different article of food is produced; but pasteurization is not a manufacturing process. It is merely a sterilizing process. Its sole purpose and result is to safeguard the health of the consumer, and consequently the health of the community in which he lives. Pasteurization is generally regarded as an invaluable achievement of modern science. Its merit lies wholly in the fact that it safeguards human life without substantially changing the properties of the food thus treated.

Our supreme court has said that, "A statute may indirectly or incidentally affect interstate commerce, as local police measures frequently do, without offending the commerce clause." (State *v.* Fairmont Creamery Co., 162 Minn. 146; 202 N. W. 714; 42 A. L. R. 548.) Plaintiff recognizes this rule in his brief, but denies its application to the situation here involved. He freely concedes that the State may require quarantine or inspection. The court regards pasteurization as an analogous requirement, having the same purpose, but less burdensome than either. Its effect upon interstate commerce is purely indirect and incidental.

Pasteurization is too well established in practice, and too strongly supported by enlightened public opinion, to be regarded as a fad or a fanatical requirement. (See Pfeffer *v.* City of Milwaukee, 171 Wis. 514; 177 N. W. 850; 10 A. L. R. 128; also see notes in 18 A. L. R. 235, and 42 A. L. R. 556.) All milk sold in Winona for many years past has been submitted to this safeguarding process, and this has been generally regarded as a most important factor in the maintenance of our excellent public health.

COURT DECISION RELATING TO PUBLIC HEALTH

Provisions concerning "shoddy" in mattress law construed.—(Indiana Supreme Court; Weisenberger *v.* State, 175 N. E. 238; decided Mar. 4, 1931.) A State law relating to the manufacture and sale of mattresses provided in part as follows:

> No person * * * shall employ or use in the making, remaking, or renovating of any mattress: * * * (b) Any material known as "shoddy," and made in whole or in part from old or worn clothing, carpets, or other fabric or material previously used, or any other fabric or material from which "shoddy" is constructed. (2) No person * * * shall sell, offer to sell * * * any mattress made, remade, or renovated in violation of subsection 1 of this section.

In a prosecution for unlawfully manufacturing bed mattresses from material known as "shoddy" and for unlawfully selling and offering to sell mattresses so manufactured, the constitutionality of the statute was challenged, it being contended that the act was inhibited by the personal liberty clause and the equal privilege and immunity section of the State constitution. The supreme court, however, stated that the evidence "will not warrant us in declaring the statute void" on such ground. "It was an affirmative act of the State to restrain a

lawful business from the exercise of abuses which would endanger health and public welfare. The statute thus construed falls short of being arbitrary or of unnecessarily invading property rights or unreasonably restraining a lawful business. It being a reasonable exercise by the State of her police power, and applying alike to all similarly situated, neither of the constitutional provisions relied on by appellant are violated."

The court, however, construed the provisions of the statute respecting "shoddy," above quoted, "to be a prohibition on the use of the materials therein specifically mentioned when they are shown to be unsanitary, or, by allegations of fact, it appears that, when they are transformed into 'shoddy' and used in mattresses, will endanger health." The court said:

> * * * The evident object of provision (*b*) was the preservation of health by prohibiting the use of things likely to disseminate disease, and nothing more. The police power does not extend to arbitrarily prevent the making of "shoddy" out of thoroughly sterilized and cleansed materials, even though the same should be old and secondhand. * * *

DEATHS DURING WEEK ENDED MAY 16, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended May 16, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended May 16, 1931	Corresponding week, 1930
Policies in force	75, 158, 197	75, 793, 257
Number of death claims	14, 697	15, 282
Death claims per 1,000 policies in force, annual rate	10. 2	10. 5

Deaths [1] from all causes in certain large cities of the United States during the week ended May 16, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon midyear population estimates derived from the 1930 census]

City	Week ended May 16, 1931				Corresponding week, 1930		Death rate [2] for first 20 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (81 cities)	7, 983	11. 7	624	[4] 48	11. 7	775	13. 5	13. 2
Akron	37	7. 5	1	10	8. 0	5	8. 5	8. 5
Albany [5]	28	11. 3	2	40	14. 3	4	15. 1	16. 7
Atlanta	71	13. 3	8	82	14. 2	8	16. 2	16. 9
White	40		6	95		5		
Colored	31	(6)	2	57	(6)	3	(6)	(6)
Baltimore [5]	204	13. 1	11	37	14. 5	11	16. 6	15. 6
White	150		6	26		9		
Colored	54	(6)	5	78	(6)	2	(6)	(6)

See foot notes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended May 16, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued.

City	Week ended May 16, 1931				Corresponding week, 1930		Death rate [2] for first 20 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Birmingham	59	11.4	0	0	13.8	8	15.2	14.4
White	30		0	0		2		
Colored	29	(6)	0	0	(6)	6	(6)	(6)
Boston	223	14.8	22	63	14.9	27	16.2	16.2
Bridgeport	24	8.5	1	17	9.9	0	12.4	13.4
Buffalo	152	13.6	13	53	13.7	14	14.9	14.5
Cambridge	33	15.1	2	40	11.5	1	14.1	14.0
Camden	22	9.6	0	0	14.9	5	17.2	15.0
Canton	29	14.2	1	23	8.9	2	11.4	11.3
Chicago [5]	653	9.8	52	46	8.9	44	11.7	11.5
Cincinnati	115	13.1	6	36	13.0	8	17.5	17.1
Cleveland	190	10.9	20	58	11.4	27	12.4	12.4
Columbus	95	16.8	11	107	14.3	7	15.0	18.2
Dallas	69	13.2	4		10.9	9	12.5	12.3
White	53		3			8		
Colored	16	(6)	1		(6)	1	(6)	(6)
Dayton	34	8.6	3	42	9.0	4	13.0	10.5
Denver	74	13.2	7	68	14.8	12	15.4	15.3
Des Moines	38	13.7	3	53	12.8	5	12.0	12.6
Detroit	261	8.2	28	45	9.1	27	9.5	10.5
Duluth	20	10.2	1	25	15.9	2	11.6	11.5
El Paso	27	13.4	10		20.3	12	17.8	18.6
Erie	30	13.3	2	37	12.6	2	11.6	11.3
Fall River [5,7]	24	10.9	3	68	15.4	6	13.3	14.2
Flint	17	5.4	1	13	8.9	5	8.1	10.2
Fort Worth	44	13.7	6		9.8	2	12.5	11.7
White	37		6			1		
Colored	7	(6)	0		(6)	1	(6)	(6)
Grand Rapids	29	8.8	4	59	9.6	6	9.7	11.5
Houston	64	10.8	8		11.7	9	11.7	12.8
White	44		7			8		
Colored	20	(6)	1		(6)	1	(6)	(6)
Indianapolis	96	13.5	3	25	9.1	5	15.0	15.6
White	85		3	28		4		
Colored	11	(6)	0	0	(6)	1	(6)	(6)
Jersey City	62	10.1	4	36	12.0	6	13.1	13.1
Kansas City, Kans	21	8.9	3	62	13.7	0	14.5	12.4
White	17		1	25		0		
Colored	4	(6)	2	254	(6)	0	(6)	(6)
Kansas City, Mo	98	12.5	4	30	12.7	6	14.8	14.1
Knoxville	29	13.8	4	85	17.1	3	14.0	15.3
White	22		3	71		3		
Colored	7	(6)	1	204	(6)	0	(6)	(6)
Long Beach	19	6.5	0	0	12.0	2	10.5	10.5
Los Angeles	272	10.8	15	44	11.1	23	11.5	11.7
Louisville	69	11.7	4	34	13.0	7	16.2	14.7
White	50		3	30		6		
Colored	19	(6)	1	66	(6)	1	(6)	(6)
Lowell [7]	24	12.4	4	102	14.5	4	13.9	15.1
Lynn	30	15.2	1	26	8.1	2	11.8	12.1
Memphis	74	14.9	7	74	18.1	11	17.7	18.3
White	33		4	67		6		
Colored	41	(6)	3	87	(6)	5	(6)	(6)
Miami	28	13.0	1	25	8.5	1	14.0	12.6
White	22		1	35		1		
Colored	6	(6)	0	0	(6)	0	(6)	(6)
Milwaukee	95	8.4	12	52	11.8	13	10.3	10.8
Minneapolis	102	11.2	9	58	11.4	15	12.1	11.5
Nashville	46	15.4	4	60	14.9	8	17.8	17.0
White	30		2	40		5		
Colored	16	(6)	2	118	(6)	3	(6)	(6)
New Bedford [7]	35	16.2	5	133	6.9	3	13.6	12.0
New Haven	31	9.9	2	38	14.1	2	13.3	14.9
New Orleans	138	15.4	10	55	18.6	13	18.7	19.2
White	78		3	25		9		
Colored	60	(6)	7	114	(6)	4	(6)	(6)
New York	1,537	11.3	121	51	10.8	199	13.0	12.2
Bronx Borough	225	8.8	15	34	8.4	28	9.3	8.7
Brooklyn Borough	507	10.1	43	46	10.3	78	12.0	11.3
Manhattan Borough	600	17.2	53	90	15.0	71	19.8	18.1
Queens Borough	157	7.1	4	11	7.3	20	8.3	7.9
Richmond Borough	48	15.3	6	108	12.1	2	14.2	15.3

See foot notes at end of table.

Deaths [1] *from all causes in certain large cities of the United States during the week ended May 16, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930*—Continued

City	Week ended May 16, 1931				Corresponding week, 1930		Death rate [2] for first 20 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Newark, N. J	93	10.9	7	37	10.7	5	13.3	13.9
Oakland	52	9.3	3	38	11.1	3	11.5	11.7
Oklahoma City	43	11.4	3	41	9.5	3	12.2	10.3
Omaha	65	15.6	9	101	10.7	3	14.8	14.2
Paterson	36	13.5	4	69	17.7	2	15.4	13.9
Philadelphia	496	13.2	44	64	13.5	39	15.5	14.0
Pittsburgh	169	13.0	12	41	12.8	15	17.3	15.6
Portland, Oreg	70	12.9	2	24	13.1	2	12.6	13.3
Providence	58	11.9	3	28	13.0	6	14.7	15.2
Richmond	57	16.1	4	58	17.1	4	17.5	16.3
White	34		2	44		2		
Colored	23	(6)	2	87	(6)	2	(6)	(6)
Rochester	94	14.8	4	36	11.1	4	13.7	12.9
St. Louis	201	12.7	6	20	10.5	11	17.4	14.8
St. Paul	53	10.0	3	31	9.0	1	11.6	11.0
Salt Lake City [5]	36	13.1	2	30	11.9	3	13.3	14.0
San Antonio	87	18.9	13		17.4	13	15.9	18.4
San Diego	48	16.0	0	0	14.3	4	15.1	15.1
San Francisco	175	14.0	7	46	14.1	7	14.2	13.8
Schenectady	16	8.7	0	0	10.9	2	11.5	12.6
Seattle	81	11.4	3	28	11.2	0	12.8	11.8
Somerville	21	10.4	1	37	8.5	2	11.1	12.1
South Bend	14	6.8	1	25	7.9	0	9.0	9.7
Spokane	23	10.3	0	0	13.5	1	13.1	13.6
Springfield, Mass	42	14.4	4	61	11.8	2	13.9	14.0
Syracuse	42	10.3	4	47	9.7	1	12.8	13.0
Tacoma	27	13.1	3	77	13.6	3	14.4	13.3
Toledo	67	11.8	8	73	12.3	9	13.1	14.3
Trenton	47	19.8	3	52	17.3	3	19.3	17.9
Utica	20	10.2	3	78	15.9	4	16.2	17.8
Washington, D. C	130	13.8	10	55	14.1	9	17.7	16.3
White	83		3	25		3		
Colored	47	(6)	7	120	(6)	6	(6)	(6)
Waterbury	17	8.8	1	30	12.5	4	11.0	10.7
Wilmington, Del. [7]	20	9.8	2	43	13.7	2	16.1	15.8
Worcester	42	11.1	4	55	8.8	1	14.8	15.1
Yonkers	22	8.8	2	52	7.7	5	9.7	9.1
Youngstown	41	12.4	6	84	12.2	7	11.4	11.2

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 76 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended May 23, 1931, and May 24, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 23, 1931, and May 24, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 23, 1931	Week ended May 24, 1930	Week ended May 23, 1931	Week ended May 24, 1930	Week ended May 23, 1931	Week ended May 24, 1930	Week ended May 23, 1931	Week ended May 24, 1930
New England States:								
Maine	8	2	2	2	5	49	1	0
New Hampshire					88	38	0	0
Vermont						50	0	0
Massachusetts	45	44	8	4	609	1,441	2	11
Rhode Island	4	3			171	29	0	0
Connecticut	6	9	2	4	634	50	2	8
Middle Atlantic States:								
New York	130	121	[1] 7	[1] 5	3,516	2,302	12	10
New Jersey	40	80	5	3	1,104	1,155	8	4
Pennsylvania	67	90			3,007	1,356	10	9
East North Central States:								
Ohio	15	26	10	14	587	628	3	1
Indiana	13	9	12		810	169	8	4
Illinois	104	144	7	5	2,220	610	22	6
Michigan	40	64		5	355	1,514	8	18
Wisconsin	15	12	14	9	702	598	0	0
West North Central States:								
Minnesota	7	14	1	2	231	185	0	1
Iowa	9	9			86	293	0	2
Missouri	34	28	7	4	409	63	3	8
North Dakota	1	6			45	19	0	0
South Dakota	5	2	1		21		0	0
Nebraska	2	15			4	137	3	0
Kansas	10	5	5		112	512	0	0
South Atlantic States:								
Delaware		1			131	7	0	0
Maryland [2]	12	23	5	5	1,105	73	4	1
District of Columbia	7	7	1	1	248	40	8	0
Virginia								
West Virginia	7	5	11	9	131	70	0	1
North Carolina	17	26	5	5	854	48	4	5
South Carolina	6	15	254	177	130	43	0	1
Georgia [3]	5	12	44	12	175	131	3	3
Florida [3]	3	5	3	2	118	210	1	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, 1931, 7 cases; 4 cases in Georgia; 1 case in Florida; 1 case in Alabama; and 1 case in Texas.

***Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 23, 1931, and May 24, 1930*—Continued.**

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 23, 1931	Week ended May 24, 1930	Week ended May 23, 1931	Week ended May 24, 1930	Week ended May 23, 1931	Week ended May 24, 1930	Week ended May 23, 1931	Week ended May 24, 1930
East South Central States:								
Kentucky	------	3	------	------	120	65	2	1
Tennessee	6	6	19	13	122	262	4	9
Alabama [3]	8	8	14	18	138	116	7	9
Mississippi	4	7	------	------	------	------	2	1
West South Central States:								
Arkansas	4	2	14	37	60	69	0	2
Louisiana	19	9	11	4	15	39	2	1
Oklahoma [4]	11	9	40	17	23	295	0	2
Texas [3]	23	34	31	6	58	232	0	0
Mountain States:								
Montana	3	------	------	------	13	20	1	0
Idaho	1	------	------	------	2	21	0	2
Wyoming	------	2	------	------	2	74	0	0
Colorado	4	10	------	------	136	749	0	1
New Mexico	6	4	2	------	118	31	0	0
Arizona	1	3	1	3	52	108	2	1
Utah [2]	1	3	1	4	2	327	0	2
Pacific States:								
Washington	6	3	------	------	405	743	0	3
Oregon	6	3	15	9	96	81	1	0
California	76	54	35	9	1,110	2,221	4	4

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended May 23, 1931	Week ended May 24, 1930	Week ended May 23, 1931	Week ended May 24, 1930	Week ended May 23, 1931	Week ended May 24, 1930	Week ended May 23, 1931	Week ended May 24, 1930
New England States:								
Maine	0	0	24	14	0	0	0	4
New Hampshire	0	0	4	14	0	0	0	0
Vermont	0	0	7	3	5	0	1	0
Massachusetts	2	0	384	239	0	0	4	3
Rhode Island	1	0	40	15	0	0	0	1
Connecticut	0	0	54	63	0	0	2	1
Middle Atlantic States:								
New York	4	0	931	433	7	8	14	14
New Jersey	1	0	305	205	6	0	3	5
Pennsylvania	1	1	404	308	0	0	13	10
East North Central States:								
Ohio	0	1	221	154	46	98	6	9
Indiana	0	1	145	110	98	145	0	4
Illinois	1	2	524	375	75	81	5	6
Michigan	0	0	470	188	26	83	4	5
Wisconsin	0	1	121	196	2	0	2	0
West North Central States:								
Minnesota	2	0	69	83	5	13	2	4
Iowa	0	0	69	33	57	90	0	0
Missouri	0	0	167	105	24	38	7	0
North Dakota	0	0	29	15	6	19	1	0
South Dakota	0	0	4	8	16	21	0	0
Nebraska	0	0	39	46	24	52	0	0
Kansas	0	0	44	51	74	55	3	3
South Atlantic States:								
Delaware	0	0	14	11	0	0	1	0
Maryland [2]	2	0	79	56	0	0	5	6
District of Columbia	0	0	13	16	0	0	2	1
Virginia	------	1	------	------	------	------	------	------
West Virginia	0	0	40	20	8	43	5	10
North Carolina	1	0	34	23	0	8	1	14
South Carolina	0	0	6	6	6	5	10	24
Georgia [3]	0	0	63	18	0	0	6	8
Florida [3]	0	2	2	0	0	0	5	3

[2] Week ended Friday.
[3] Typhus fever, 1931, 7 cases; 4 cases in Georgia; 1 case in Florida; 1 case in Alabama; and 1 case in Texas.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 23, 1931, and May 24, 1930—Continued.

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended May 23, 1931	Week ended May 24, 1930	Week ended May 23, 1931	Week ended May 24, 1930	Week ended May 23, 1931	Week ended May 24, 1930	Week ended May 23, 1931	Week ended May 24, 1930
East South Central States:								
Kentucky	0	0	33	38	4	0	8	4
Tennessee	0	0	22	38	9	11	6	11
Alabama [3]	1	2	29	12	6	8	7	9
Mississippi	0	0	15	7	37	8	13	10
West South Central States:								
Arkansas	0	0	12	5	33	4	5	2
Louisiana	0	3	21	14	12	2	7	13
Oklahoma [4]	0	0	22	32	52	121	8	5
Texas [3]	0	0	23	28	40	38	6	1
Mountain States:								
Montana	0	0	16	32	1	2	0	0
Idaho	0	0	4	5	1	0	1	1
Wyoming	0	0	9	2	1	11	0	0
Colorado	0	0	36	19	6	11	0	8
New Mexico	0	0	7	7	1	14	2	3
Arizona	0	1	3	8	0	5	2	5
Utah [1]	0	0	4	5	1	2	0	0
Pacific States:								
Washington	0	0	38	37	26	44	4	1
Oregon	0	0	13	26	19	23	0	0
California	3	11	114	109	21	64	9	18

[1] Week ended Friday.
[3] Typhus fever, 1931, 7 cases; 4 cases in Georgia; 1 case in Florida; 1 case in Alabama; and 1 case in Texas.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
March, 1931										
Hawaii Territory	1	50	10		489		3	4	0	4
April, 1931										
California	39	326	690	2	7,354	11	22	772	239	57
Idaho	6	14	80		20		0	67	13	12
Illinois	99	494	67	1	7,259		4	2,296	245	25
Louisiana	8	76	123	15	19	70	1	88	150	31
Maine	1	17	42		114		2	109	0	7
Maryland	10	52	97		5,981		0	307	0	15
Michigan	41	143	37		466		5	1,502	96	15
Minnesota	9	50	8		466		0	369	25	5
Missouri	52	121	159	7	2,036		0	1,407	213	7
Montana	4	10	52		93		0	139	14	5
Nevada	1	2	178		89		0	4	0	0
New Hampshire		8					1	12	0	2
New Mexico	6	8	73	8	232	4	1	27	7	9
New York	57	476		5	10,483		8	3,982	16	49
North Carolina	16	91	123		3,805	124	1	176	6	11
Ohio	22	194	258	2	3,504		2	1,989	288	22
Oklahoma [1]	8	55	523	79	83	54	1	143	306	19
Oregon	2	20	288		548		0	53	110	2
Rhode Island	1	25	6		178		0	314	0	3
Texas	1	99	309	435		1	1	171		20
Washington	6	30	116		413		2	177	180	14
West Virginia	3	39	258		324		4	188	14	21
Wisconsin	9	51	218		2,806		4	626	28	6

[1] Exclusive of Oklahoma City and Tulsa.

March, 1931	Cases
Hawaii Territory:	
Chicken pox	50
Conjunctivitis, follicular	44
Dysentery (amebic)	1
Dysentery (bacillary)	4
Hookworm disease	7
Leprosy	7
Mumps	72
Tetanus	2
Trachoma	1
April, 1931	
Anthrax:	
Montana	1
Washington	2
Chicken pox:	
California	2,734
Idaho	11
Illinois	1,532
Louisiana	57
Maine	133
Maryland	466
Michigan	1,235
Minnesota	735
Missouri	317
Montana	227
Nevada	13
New Mexico	172
New York	2,902
North Carolina	556
Ohio	2,116
Oklahoma [1]	185
Oregon	232
Rhode Island	71
Washington	527
West Virginia	236
Wisconsin	1,590
Conjunctivitis:	
Maine	3
Montana	1
New Mexico	7
Diarrhea:	
Maryland	5
Diarrhea and enteristis (under 2 years):	
Ohio	6
Dysentery:	
California (amebic)	4
California (bacillary)	14
Illinois	8
Illinois (amebic)	1
Louisiana	1
Minnseota	3
Minnesota (amebic)	3
New Mexico (amebic)	1
New York	9
Ohio	1
Oklahoma [1]	9
Washington	1
Food poisoning:	
California	27
Ohio	14
German measles:	
California	139
Illinois	133
Maine	5

[1] Exclusive of Oklahoma City and Tulsa.

German measles—Continued.	Cases
Maryland	384
Michigan	183
New Mexico	7
New York	1,681
North Carolina	2,651
Ohio	262
Rhode Island	12
Washington	68
Wisconsin	422
Hookworm disease:	
California	1
Louisiana	28
Impetigo contagiosa:	
Illinois	2
Maryland	4
Montana	2
Oregon	14
Jaundice:	
California	7
Maryland	4
Lead poisoning:	
Illinois	1
Ohio	10
Leprosy:	
California	4
Louisiana	2
Washington	1
Lethargic encephalitis:	
California	4
Illinois	5
Maine	3
Maryland	1
Michigan	3
Minnesota	2
New York	17
Ohio	6
Texas	1
Washington	6
Wisconsin	2
Mumps:	
California	1,597
Idaho	47
Illinois	1,312
Louisiana	3
Maine	162
Maryland	365
Michigan	694
Missouri	157
Montana	111
Nevada	11
New Mexico	96
New York	2,029
Ohio	2,511
Oklahoma [1]	41
Oregon	308
Rhode Island	393
Washington	273
Wisconsin	3,778
Ophthalmia neonatorum:	
California	1
Illinois	5
Maryland	3
Minnesota	1
Missouri	1

Ophthalmia neonatorum—Continued.	Cases
New York	1
Ohio	90
Oklahoma [1]	1
Wisconsin	1
Paratyphoid fever:	
Illinois	2
Maine	1
New York	1
Oregon	3
Texas	1
Washington	1
Puerperal septicemia:	
Illinois	2
New York	18
Ohio	12
Washington	4
Rabies in animals:	
California	98
Illinois	5
Louisiana	15
Maryland	2
Missouri	3
New York	7
Rhode Island	3
Washington	1
Rabies in man:	
Louisiana	1
West Virginia	1
Rocky Mountain spotted or tick fever:	
Idaho	7
Montana	10
Nevada	5
Oregon	15
Scabies:	
Maryland	7
Oregon	9
Septic sore throat:	
California	32
Illinois	13
Louisiana	1
Maryland	7
Michigan	27
Missouri	16
Montana	2
New York	36
North Carolina	10
Ohio	155
Oklahoma [1]	44
Oregon	3
Rhode Island	6
Tetanus:	
California	4
Maryland	1
Missouri	1
New York	7
Oklahoma [1]	1
Rhode Island	1
Trachoma:	
California	10
Illinois	4
Louisiana	1

[1] Exclusive of Oklahoma City and Tulsa.

Trachoma—Continued.	Cases
Missouri	82
Montana	28
New Mexico	1
New York	2
Ohio	5
Oklahoma [1]	9
Wisconsin	2
Trichinosis:	
California	3
Maryland	2
New York	6
Tularæmia:	
Illinois	2
Louisiana	4
Missouri	1
Montana	1
North Carolina	1
Typhus fever:	
New York	2
Undulant fever:	
California	7
Illinois	22
Louisiana	5
Maine	1
Maryland	1
Michigan	2
Minnesota	5
Missouri	8
New Mexico	1
New York	16
Ohio	14
Washington	4
Vincent's angina:	
Illinois	1
Maine	2
Maryland	15
New York	[2] 76
Oregon	5
Whooping cough:	
California	1,773
Idaho	299
Illinois	735
Louisiana	25
Maine	222
Maryland	132
Michigan	855
Minnesota	177
Missouri	160
Montana	135
Nevada	28
New Mexico	105
New York	2,066
North Carolina	740
Ohio	391
Oklahoma [1]	45
Oregon	60
Rhode Island	42
Washington	562
West Virginia	367
Wisconsin	445

[2] Exclusive of New York City.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 97 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,370,000. The estimated population of the 90 cities reporting deaths is more than 31,825,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended May 16, 1931, and May 17, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	799	888	
97 cities	400	468	751
Measles:			
44 States	21,232	19,374	
97 cities	9,008	7,774	
Meningococcus meningitis:			
46 States	120	175	
97 cities	62	78	
Poliomyelitis:			
46 States	21	38	
Scarlet fever:			
46 States	5,401	3,468	
97 cities	2,499	1,424	1,294
Small pox:			
46 States	880	1,298	
97 cities	112	139	56
Typhoid fever:			
46 States	190	238	
97 cities	31	51	34
Deaths reported			
Influenza and pneumonia:			
90 cities	671	654	
Smallpox:			
90 cities	1	0	
Memphis, Tenn.	1	0	

City reports for week ended May 16, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	11	0	0		0	1	9	2
New Hampshire:								
Concord	0	0	0		0	37	0	0

City reports for week ended May 16, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
NEW ENGLAND—continued								
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	2	0	0		0	0	0	0
Massachusetts:								
Boston	63	30	8	1	0	98	10	22
Fall River	3	2	0		0	18	4	3
Springfield	12	2	1		0	22	31	1
Worcester	8	3	2		0	10	12	2
Rhode Island:								
Pawtucket	8	1	0		0	1	2	1
Providence	7	5	2		1	71	2	7
Connecticut:								
Bridgeport	0	8	0		0	18	1	2
Hartford	5	5	3		0	22	2	5
New Haven	39	1	0		0	187	10	2
MIDDLE ATLANTIC								
New York:								
Buffalo	17	9	7		1	351	46	9
New York	324	239	109	11	4	1,842	65	162
Rochester	13	4	1		0	90	17	3
Syracuse	16	3	0		0	1	1	0
New Jersey:								
Camden	4	6	0		0	2	6	2
Newark	83	15	8	1	1	18	12	4
Trenton	5	2	0		1	0	3	
Pennsylvania:								
Philadelphia	113	55	2	8	5	891	26	47
Pittsburgh	65	15	3	1	4	119	53	89
Reading	7	1	0		0	9	10	2
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	4	5	1		0	117	20	7
Cleveland	224	21	11	12	3	249	410	17
Columbus	18	3	1	1	1	11	3	2
Toledo	24	3	2		0		40	2
Indiana:								
Fort Wayne	3	1	2		0	12	0	0
Indianapolis	35	3	0		1	551	40	8
South Bend	4	1	0		0	7	0	2
Terre Haute	3	0	0		0	9	0	0
Illinois:								
Chicago	143	81	84	1	2	783	89	46
Springfield	5	0	0		0	57	3	4
Michigan:								
Detroit	119	41	19		1	33	61	22
Flint	47	2	1		0	2	10	2
Grand Rapids	3	1	0		0	24	0	3
Wisconsin:								
Kenosha	0	0	0		0	1	128	0
Madison	17	0	6			1	67	
Milwaukee	126	10	0		0	302	490	7
Racine	7	1	0		0	3	2	0
Superior	4	0	0		0	0	1	1
WEST NORTH CENTRAL								
Minnesota:								
Duluth	8	0	0		0	1	1	1
Minneapolis	104	12	4		1	248	125	9
St. Paul	79	8	0	1	1	129	3	0
Iowa:								
Davenport	1	0	0			0	0	
Des Moines	1	1	2			0	0	
Sioux City	15	0	1			2	35	
Waterloo	4	0	0			0	0	
Missouri:								
Kansas City	16	3	8		1	319	7	4
St. Joseph	1	0	4		0	9	0	2
St. Louis	22	80	17			11	19	12

City reports for week ended May 16, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
WEST NORTH CENTRAL—continued								
North Dakota:								
Fargo	2	0	0		0		13	0
Grand Forks	0	0	0			0	1	
South Dakota:								
Aberdeen	3	0	0			6	0	
Sioux Falls	0	0	0			0	0	
Nebraska:								
Omaha	16	2	2		0	1	29	7
Kansas:								
Topeka	3	1	1	1	0	2	45	1
Wichita	16	1	5		0	8	4	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	3	2	0		0	46	5	0
Maryland:								
Baltimore	49	20	12	1	2	794	33	22
Cumberland	0	0	0		0	1	0	3
Frederick	0	0	0		0	8	0	0
District of Columbia:								
Washington	15	12	6	2	1	353	0	7
Virginia:								
Lynchburg	16	0	0		0	11	0	1
Norfolk	10	1	0		0	270	0	2
Richmond	0	1	2		0	208	1	2
Roanoke	10	0	0		0	15	3	4
West Virginia:								
Charleston	0	1	0		0	1	0	1
Wheeling	13	0	0		0	0	1	0
North Carolina:								
Raleigh	3	1	0		0	54	0	1
Wilmington	1	0	0		0	1	0	1
Winston-Salem	6	0	1		1	127	6	0
South Carolina:								
Charleston	0	0	0	22	1	1	0	3
Columbia	0	0	1		1	0	2	7
Greenville	2	0	0		0	0	0	0
Georgia:								
Atlanta	6	2	4	11	2	34	0	10
Brunswick	0	0	0		0	0	6	0
Savannah	6	0	1	13	0	16	9	2
Florida:								
Miami	12	1	3		0	124	0	0
Tampa	5	1	1		0	34	0	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	1	1		0	8	0	3
Tennessee:								
Memphis	7	2	2		4	111	8	8
Nashville	1	1	0		1	87	0	5
Alabama:								
Birmingham	1	1	0	3	1	6	0	3
Mobile	0	0	0		2	0	0	1
Montgomery	11	0	0			0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	5	0	0			0	0	
Little Rock	0	0	0		0	3	13	3
Louisiana:								
New Orleans	8	8	11	2	0	1	0	7
Shreveport	3	1	1		0	0	2	1
Oklahoma:								
Muskogee	2	0	1	11		0	8	
Oklahoma City	3	1	0	1	2	3	0	10
Texas:								
Dallas	34	3	8		0	1	11	6
Fort Worth	17	1	3		2	1	0	1
Galveston	0	0	1		0	4	0	2
Houston	2	4	2		0	14	0	4
San Antonio	5	1	1		2	26	0	10

City reports for week ended May 16, 1931—**Continued**

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
MOUNTAIN								
Montana:								
Billings	5	0	0		0	2	0	0
Great Falls	4	0	1		1	1	0	1
Helena	2	0	0		0	0	0	0
Missoula	15	0	0		0	0	0	1
Idaho:								
Boise	1	0	0		0	0	3	0
Colorado:								
Denver	37	8	4		0	39	36	6
Pueblo	1	0	0		0	16	1	0
New Mexico:								
Albuquerque	16	0	0		0	2	1	0
Arizona:								
Pheonix	0	0	0		0	1	0	3
Utah:								
Salt Lake City	28	2	2		0	3	10	0
Nevada:								
Reno	0	0	0		0	0	0	1
PACIFIC								
Washington:								
Seattle	63	2	0			11	22	
Spokane	12	2	0			0	0	
Tacoma		1						
Oregon:								
Portland	26	5	0	2	0	26	10	6
Salem	4	1	1	1		12	13	
California:								
Los Angeles	66	32	28	33	2	134	15	9
Sacramento	8	2	3		0	66	4	1
San Francisco	66	13	5	3	1	72	10	12

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	3	14	0	0	0	0	1	1	0	2	18
New Hampshire:											
Concord	1	3	0	0	0	1	0	0	0	0	6
Vermont:											
Barre	1	1	0	0	0	1	0	0	0	5	3
Burlington	0	1	0	0	0	0	0	0	0	1	7
Massachusetts:											
Boston	71	124	0	0	0	20	1	1	0	26	223
Fall River	4	15	0	0	0	2	1	0	0	1	24
Springfield	8	17	0	0	0	0	0	0	0	2	40
Worcester	8	39	0	0	0	5	0	0	0	7	42
Rhode Island:											
Pawtucket	3	12	0	0	0	1	0	0	0	1	12
Providence	11	43	0	0	0	2	0	0	0	1	58
Connecticut:											4
Bridgeport	9	3	0	0	0	0	0	0	0	1	24
Hartford	5	4	0	0	0	1	0	0	0	3	31
New Haven	5	2	0	0	0	1	0	0	0	5	31
MIDDLE ATLANTIC											
New York:											
Buffalo	24	34	0	3	0	12	1	0	0	26	149
New York	284	459	0	0	0	94	8	10	1	164	1,547
Rochester	10	87	0	0	0	1	0	0	0	17	89
Syracuse	10	30	0	0	0	2	0	0	0	23	42

City reports for week ended May 16, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
MIDDLE ATLANTIC—continued											
New Jersey:											
Camden	5	10	0	0	0	1	0	0	0	1	22
Newark	28	49	0	0	0	10	0	0	0	54	101
Trenton	3	8	0	0	0	5	0	1	0	0	47
Pennsylvania:											
Philadelphia	92	202	0	0	0	32	2	1	0	22	496
Pittsburgh	29	102	0	0	0	9	0	0	0	20	169
Reading	5	1	0	0	0	0	0	0	0	0	21
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	16	55	3	0	0	11	1	0	0	2	115
Cleveland	40	85	0	1	0	17	1	0	0	30	190
Columbus	8	7	0	1	0	6	0	0	0	1	95
Toledo	11	9	1	4	0	5	0	0	1	13	67
Indiana:											
Fort Wayne	4	3	2	0	0	0	0	1	0	1	18
Indianapolis	13	36	6	28	0	3	0	0	0	49	-------
South Bend	4	5	0	0	0	0	0	0	0	2	15
Terre Haute	2	4	0	0	0	0	0	0	0	0	19
Illinois:											
Chicago	116	299	2	1	0	37	2	1	1	44	653
Springfield	3	5	1	0	0	0	0	1	0	0	25
Michigan:											
Detroit	111	168	1	0	0	28	1	0	0	104	261
Flint	9	31	2	6	0	1	0	0	0	8	17
Grand Rapids	10	12	1	0	0	2	0	0	0	12	29
Wisconsin:											
Kenosha	2	3	0	0	0	0	0	0	0	5	8
Madison	3	3	0	0	-------	-------	0	0	-------	4	-------
Milwaukee	29	33	0	1	0	6	0	0	0	13	95
Racine	4	0	0	0	0	0	0	0	0	10	11
Superior	2	1	0	0	0	0	1	0	0	0	9
WEST NORTH CENTRAL											
Minnesota:											
Duluth	7	1	0	0	0	1	0	1	0	3	20
Minneapolis	31	7	1	0	0	4	1	0	0	20	102
St. Paul	21	7	0	0	0	3	0	2	0	24	59
Iowa:											
Davenport	1	1	1	5	-------	-------	0	0	-------	0	-------
Des Moines	8	9	2	11	-------	-------	0	0	-------	2	38
Sioux City	2	14	0	7	-------	-------	0	0	-------	4	-------
Waterloo	2	1	0	0	-------	-------	0	0	-------	5	-------
Missouri:											
Kansas City	17	3	1	0	0	7	0	0	0	9	98
St. Joseph	8	3	0	0	0	0	0	0	0	0	29
St. Louis	81	157	2	1	0	10	0	0	0	35	201
North Dakota:											
Fargo	1	2	0	0	0	0	0	0	0	5	5
Grand Forks	1	0	0	0	-------	-------	0	0	-------	1	-------
South Dakota:											
Aberdeen	1	1	0	0	-------	-------	0	0	-------	0	-------
Sioux Falls	1	0	0	0	-------	-------	0	0	-------	0	8
Nebraska:											
Omaha	3	4	4	12	0	2	0	0	0	2	65
Kansas:											
Topeka	2	1	0	0	0	0	0	0	0	6	21
Wichita	3	0	1	19	0	1	0	0	0	4	32
SOUTH ATLANTIC											
Delaware:											
Wilmington	4	11	0	0	0	1	0	0	0	2	20
Maryland:											
Baltimore	37	36	0	0	0	14	2	3	2	38	204
Cumberland	0	1	0	0	0	0	0	0	0	0	13
Frederick	0	0	0	0	0	0	0	0	0	0	6

City reports for week ended May 16, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
SOUTH ATLANTIC—continued											
District of Col.:											
Washington	23	14	0	0	0	13	0	0	0	11	136
Virginia:											
Lynchburg	0	0	0	0	0	0	0	0	0	0	11
Norfolk	1	2	1	0	0	3	0	0	0	5	--------
Richmond	3	9	0	0	0	4	1	0	0	2	52
Roanoke	0	0	1	0	0	2	0	0	0	2	24
West Virginia:											
Charleston	0	0	0	0	0	0	0	0	0	0	7
Wheeling	1	1	0	0	0	0	0	0	0	0	17
North Carolina:											
Raleigh	0	0	0	0	0	1	0	0	0	27	13
Wilmington	0	2	0	0	0	0	0	0	0	28	11
Winston-Salem	0	1	1	0	0	3	0	0	0	17	15
South Carolina:											
Charleston	0	0	0	0	0	0	0	0	0	0	25
Columbia	0	0	0	0	0	2	0	0	0	1	35
Greenville	1	1	1	0	0	0	0	0	0	0	--------
Georgia:											
Atlanta	4	45	2	3	0	6	0	3	0	8	71
Brunswick	0	0	0	0	0	0	0	0	0	0	3
Savannah	0	0	0	0	0	1	0	0	0	15	30
Florida:											
Miami	0	0	1	0	0	2	1	0	0	3	28
Tampa	0	8	0	0	0	1	1	0	0	5	15
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	10	1	0	0	0	0	0	0	0	19
Tennessee:											
Memphis	6	36	0	2	1	8	1	1	0	20	74
Nashville	1	6	0	0	0	1	1	0	0	2	46
Alabama:											
Birmingham	1	5	0	0	0	7	1	2	0	5	59
Mobile	0	0	0	0	0	1	0	0	0	0	20
Montgomery	0	1	0	0	--------	--------	0	0	--------	0	--------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0	--------	--------	0	0	--------	3	--------
Little Rock	0	1	0	0	0	2	0	0	0	0	5
Louisiana:											
New Orleans	10	20	0	10	0	11	2	0	0	1	138
Shreveport	0	0	1	1	0	1	0	0	0	5	33
Oklahoma:											
Muskogee	1	1	2	1	--------	--------	0	0	--------	0	--------
Oklahoma City	3	4	2	6	0	1	0	0	0	0	--------
Texas:											
Dallas	3	5	2	0	0	3	0	0	0	14	69
Fort Worth	2	3	3	10	0	2	0	0	0	0	44
Galveston	0	0	1	0	0	3	1	1	0	0	17
Houston	1	4	1	1	0	4	0	0	0	0	64
San Antonio	0	2	0	0	0	11	0	1	0	0	87
MOUNTAIN											
Montana:											
Billings	0	0	1	0	0	0	0	0	0	4	10
Great Falls	1	2	0	0	0	0	0	0	0	6	8
Helena	0	0	0	0	0	0	0	0	0	0	5
Missoula	0	0	0	0	0	0	0	0	0	0	5
Idaho:											
Boise	0	1	0	0	0	0	0	0	0	0	1
Colorado:											
Denver	13	12	0	2	0	3	0	0	0	41	73
Pueblo	1	0	0	0	0	0	0	0	0	3	8
New Mexico:											
Albuquerque	0	0	0	0	0	3	0	0	0	3	10
Arizona:											
Phoenix	1	1	0	0	0	6	0	0	0	0	--------

City reports for week ended May 16, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
MOUNTAIN—contd.											
Utah:											
Salt Lake City	2	3	0	0	0	0	0	0	0	29	36
Nevada:											
Reno	0	0	1	0	0	0	0	0	0	0	2
PACIFIC											
Washington:											
Seattle	8	5	8	0			1	0		67	
Spokane	5	3	6	10			0	0		6	
Tacoma	8		3				0				
Oregon:											
Portland	5	4	8	7	0	2	1	0	0	2	76
Salem	0	0	0	1			0	0		0	
California:											
Los Angeles	30	45	6	3	0	21	1	0	0	25	272
Sacramento	2	1	0	0	0	3	0	0	1	17	21
San Francisco	21	8	1	0	0	18	1	0	0	29	204

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases estimated expectancy	Poliomyelitis: Cases	Poliomyelitis: Deaths
NEW ENGLAND									
Massachusetts:									
Boston	2	1	0	0	1	0	0	0	0
Connecticut:									
Bridgeport	1	0	1	0	0	0	0	0	0
Hartford	0	0	0	1	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
New York	11	6	4	3	0	0	1	3	0
Rochester	1	1	0	0	0	0	0	0	0
New Jersey:									
Newark	5	0	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	3	0	0	1	0	0	0	0	0
Pittsburgh	2	2	0	0	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	0	0	0	0	0	0	0	0
Cleveland	1	1	0	0	0	0	0	0	0
Indiana:									
Indianapolis	5	2	0	0	0	0	0	0	0
Illinois:									
Chicago	10	5	1	1	0	0	0	0	0
Springfield	1	0	0	0	0	0	0	0	0
Michigan:									
Detroit	3	3	0	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	1	0	0	0	0	0	0	0	0
Missouri:									
Kansas City	1	0	0	0	0	0	0	0	0
St. Joseph	0	1	0	0	0	0	0	0	0
St. Louis	2	1	0	0	0	0	0	0	0
North Dakota:									
Fargo	1	0	0	0	0	0	0	0	0

City reports for week ended May 16, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
SOUTH ATLANTIC									
Maryland:									
Baltimore	2	1	0	0	0	0	0	0	0
Virginia:									
Lynchburg	0	0	0	0	0	1	0	0	0
North Carolina:									
Raleigh	0	1	0	0	1	0	0	0	0
Winston-Salem	0	0	0	0	0	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	5	0	0	0	0
Columbia	1	3	0	0	0	0	0	0	0
Georgia:									
Atlanta	1	1	0	0	3	0	0	0	0
Savannah [1]	0	0	0	0	3	0	0	0	0
Florida:									
Tampa	0	0	0	0	1	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis [2]	1	0	0	0	0	0	0	1	0
Alabama:									
Birmingham	1	1	0	1	0	1	0	0	0
Mobile	0	0	0	0	0	1	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock [1]	1	0	0	0	0	0	0	0	0
Louisiana:									
New Orleans	4	1	0	0	2	2	0	0	0
Oklahoma:									
Oklahoma City	0	2	0	0	0	0	0	0	0
Texas:									
Dallas	0	0	0	0	1	0	0	0	0
Houston	0	0	0	0	0	2	0	0	0
PACIFIC									
Oregon:									
Portland	0	1	0	0	0	0	0	0	0
California:									
Los Angeles [2]	0	1	0	0	1	1	1	0	0
San Francisco	0	0	0	0	2	0	0	1	0

[1] Typhus fever: 3 cases; 2 cases at Savannah, Ga., and 1 case at Little Rock, Ark.
[2] Rabies (in man): 2 cases and 2 deaths; 1 case and 1 death at Memphis, Tenn., and 1 case and 1 death at Los Angeles, Calif.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended May 16, 1931, compared with those for a like period ended May 17, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, April 12 to May 16, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930
98 cities	66	86	53	91	63	83	[2] 67	77	[3] 62	74
New England	79	119	58	85	36	82	[4] 35	65	38	106
Middle Atlantic	62	83	46	99	61	72	61	85	58	74
East North Central	83	96	58	113	84	130	82	103	72	91
West North Central	63	87	67	68	57	68	71	45	71	74
South Atlantic	65	64	51	64	69	50	63	62	55	54
East South Central	23	18	23	48	6	0	41	6	17	36
West South Central	74	206	71	101	68	94	108	73	81	66
Mountain	17	9	26	88	26	44	[5] 28	70	61	35
Pacific	43	36	63	49	53	61	61	49	[3] 73	43

MEASLES CASE RATES

	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930
98 cities	1,316	1,227	1,342	1,356	1,250	1,293	[2] 1,308	1,411	[3] 1,407	1,255
New England	1,349	1,628	1,286	1,710	964	1,912	[4] 1,103	2,303	1,166	1,843
Middle Atlantic	1,543	1,097	1,418	1,192	1,411	1,284	1,433	1,295	1,486	1,337
East North Central	790	1,074	1,075	999	897	1,005	1,102	927	1,313	814
West North Central	589	1,009	830	1,352	777	1,003	1,016	1,269	1,396	831
South Atlantic	4,343	1,089	4,049	1,306	3,871	1,188	3,553	1,298	3,365	1,228
East South Central	1,612	299	1,600	407	1,426	185	1,263	442	1,234	359
West South Central	101	502	139	592	156	731	152	711	166	735
Mountain	923	6,793	661	8,802	661	5,912	[5] 576	9,128	531	6,652
Pacific	417	1,800	517	2,067	505	1,773	501	1,992	[3] 578	1,670

SCARLET FEVER CASE RATES

	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930
98 cities	382	298	405	262	308	296	[2] 350	258	[3] 390	226
New England	584	402	575	348	582	268	[4] 631	310	666	261
Middle Atlantic	415	262	488	239	409	285	418	266	439	222
East North Central	383	391	432	360	402	391	430	318	454	306
West North Central	518	366	469	248	480	384	440	238	383	262
South Atlantic	306	302	304	248	273	294	276	242	243	172
East South Central	582	143	396	126	407	132	250	138	337	24
West South Central	112	115	98	59	132	115	105	94	108	73
Mountain	278	352	191	229	191	361	[5] 177	370	157	229
Pacific	116	144	86	176	94	109	106	130	[3] 127	128

SMALLPOX CASE RATES

	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930
98 cities	22	27	21	30	27	27	[2] 15	24	[3] 17	22
New England	0	2	0	0	0	0	[4] 0	2	0	0
Middle Atlantic	2	0	1	0	1	1	3	0	1	0
East North Central	19	23	20	18	10	21	6	22	23	16
West North Central	92	139	71	145	125	132	78	101	75	126
South Atlantic	10	4	6	0	6	0	8	0	6	4
East South Central	52	18	35	42	58	36	41	6	12	72
West South Central	95	70	98	38	101	31	64	38	41	21
Mountain	9	26	17	97	0	150	[5] 0	79	17	62
Pacific	27	71	41	109	51	73	12	83	[3] 27	47

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931, and 1930, respectively.
[2] Pawtucket, R. I., Billings, Mont.; and Boise, Idaho, not included.
[3] Tacoma, Wash , not included.
[4] Pawtucket, R. I., not included.
[5] Billings, Mont., and Boise, Idaho, not included.

Summary of weekly reports from cities, April 12 to May 16, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930
98 cities	5	6	3	6	6	6	[2] 5	6	[3] 5	8
New England	2	7	2	5	7	2	[4] 5	0	5	10
Middle Atlantic	4	2	4	5	7	3	5	4	5	7
East North Central	2	2	2	6	4	6	2	2	2	2
West North Central	4	8	4	4	4	4	2	8	6	8
South Atlantic	8	22	2	12	14	6	8	16	12	14
East South Central	12	6	6	0	12	24	6	18	17	42
West South Central	7	7	0	24	0	21	7	3	7	35
Mountain	9	18	9	0	0	53	[5] 0	18	0	0
Pacific	10	8	4	4	6	6	8	20	[3] 0	2

INFLUENZA DEATH RATES

	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930
91 cities	17	15	13	12	11	9	[2] 12	9	[3] 8	8
New England	7	7	7	12	7	5	[4] 5	10	2	0
Middle Atlantic	12	14	12	9	12	9	11	10	7	7
East North Central	10	12	6	14	5	7	11	9	5	4
West North Central	29	18	18	9	12	9	6	3	9	8
South Atlantic	32	22	10	12	20	16	22	6	16	20
East South Central	76	58	44	39	19	19	50	13	50	39
West South Central	45	25	55	25	38	21	14	28	7	4
Mountain	17	9	17	18	26	0	[5] 28	0	9	9
Pacific	10	2	5	0	2	5	7	7	[3] 8	12

PNEUMONIA DEATH RATES

	Apr. 18, 1931	Apr. 19, 1930	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930
91 cities	161	149	137	140	121	135	[2] 117	133	[3] 102	102
New England	144	160	132	189	154	161	[4] 135	131	113	111
Middle Atlantic	180	180	165	160	141	163	144	176	121	124
East North Central	128	114	98	108	77	107	87	92	74	67
West North Central	244	156	230	81	180	114	121	126	103	108
South Atlantic	188	202	168	210	180	204	130	132	126	170
East South Central	290	207	126	227	120	123	120	142	126	84
West South Central	173	121	145	132	152	110	114	164	114	78
Mountain	113	167	104	150	61	62	[5] 102	123	78	79
Pacific	67	87	46	50	46	42	70	52	[3] 56	47

[2] Pawtucket, R. I.; Billings, Mont.; and Boise, Idaho, not included.
[3] Tacoma, Wash., not included.
[4] Pawtucket, R. I., not included.
[5] Billings, Mont., and Boise, Idaho, not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended May 9, 1931.—The Department of Pensions and National Health reports cases of certain communicable diseases for the week ended May 9, 1931, as follows:

Provinces	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia		3			1
New Brunswick [1]					
Quebec	1				21
Ontario			1	17	10
Manitoba				4	3
Saskatchewan				7	
Alberta			1		1
British Columbia [1]					
Total	1	3	2	28	36

[1] No case of any disease included in the table was reported during the week

Quebec Province—Communicable diseases—Week ended May 16, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended May 16, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	45	Puerperal septicemia	1
Diphtheria	24	Scarlet fever	64
Erysipelas	7	Tuberculosis	52
German measles	12	Typhoid fever	9
Measles	626	Whooping cough	20

Quebec Province—Vital statistics—March, 1931.—Births, deaths, and marriages for the month of March, 1931, in the Province of Quebec, Canada, with deaths from certain specified causes, are shown in the following table:

Estimated population	2,782,500	Deaths from—	
Births	6,727	Influenza	187
Birth rate per 1,000 population	28.5	Lethargic encephalitis	1
Deaths	3,030	Measles	5
Death rate per 1,000 population	12.8	Nephritis	188
Marriages	353	Pneumonia	366
Deaths under 1 year	768	Puerperal state	38
Deaths under 1 year per 1,000 births	114.2	Scarlet fever	9
Deaths from—		Syphilis	18
Cancer	198	Traffic	16
Cerebrospinal meningitis	9	Tuberculosis (pulmonary)	244
Diabetes	34	Tuberculosis (other forms)	55
Diarrhea	127	Typhoid fever	14
Diphtheria	18	Violence	68
Heart disease	321	Whooping cough	23

CUBA

Provinces—Communicable diseases—Four weeks ended April 11, 1931.—During the four weeks ended April 11, 1931, cases of certain communicable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer				2	1	1	4
Chicken pox	2	56	6	41	10	2	117
Diphtheria		13		3			16
Malaria		2		1	2	70	75
Measles		70		18			88
Paratyphoid fever				1			1
Scarlet fever	2	7				2	11
Typhoid fever	1	16		37	8	17	79

NEWFOUNDLAND

Vital statistics—1929 and 1930.—According to the annual report of the registrar of births, marriages, and deaths, the estimated population of Newfoundland and Labrador was 275,888 on January 1, 1931, as compared with 263,033 in 1921. These figures include about 4,000 in Labrador for each year.

During the year 1930 births showed a decrease of 91 as compared with 1929, deaths a decrease of 194, and marriages a decrease of 19. The death rate was 13.9 per 1,000 population and the infant mortality rate per 1,000 births was 134.77. There were 573 deaths from general tuberculosis in 1930, as compared with 614 in 1929, and 232 deaths from cancer as compared with 221 during the previous year. Cancer has shown a steady increase in the last 10 years. The cause of the greatest number of deaths during the year 1930 was tuberculosis, the pulmonary form causing 468 and other types of the disease 105 deaths.

VIRGIN ISLANDS

Communicable diseases—April, 1931.—During the month of April, 1931, cases of certain communicable diseases were reported in the Virgin Islands as follows:

St. Thomas and St. John:	Cases.
Chicken pox	2
Gonorrhea	1
Pellagra	3
Syphilis	6

St. Croix:	Cases.
Chicken pox	8
Filariasis	1

YUGOSLAVIA

Communicable diseases—April, 1931.—During the month of April, 1931, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	23	6	Poliomyelitis	1	
Cerebrospinal meningitis	20	11	Puerperal septicemia	4	
Diphtheria	420	50	Scarlet fever	360	53
Dysentery	22	2	Rabies	1	1
Erysipelas	161	17	Tetanus	21	12
Measles	1,065	53	Typhoid fever	117	13
Paratyphoid fever	5		Typhus fever	43	5

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases, D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931			March, 1931				April, 1931				May, 1931		
					14	21	28	7	14	21	28	4	11	18	25	2	9	16
Ceylon: Colombo	C								1									
China:																		
Canton	C												1					
India	C	11,112	10,687	15,334	3,529	2,549	3,173	2,293	2,471	857	2,551	2,989						
	D	5,933	5,689	8,123	1,846	1,325	1,703	1,257	1,252	473	1,314	1,511						
Bassein	C														2			
	D														2			
Bombay	C	13		21									2					
	D	7		9									1					
Calcutta	C	22	28	121	27	33	45	65	80	102	120	125	95	82	71			
	D	16	20	86	22	25	26	39	49	68	69	70	55	51	44			
Karikal	C		1		4		1	4	2	1	7	2	10	8			10	
	D				4			4	2	1	7	2	5	8			5	
Madras	C		201	99	18	20	19	15	4	5	7	4	3	1	4	18	18	
	D		67	47	5	4	14	6	5	3	2		5	1	3	5	6	
Negapatam	D			3	1		2											
Rangoon	C		1															
	D		1	1														
Tuticorin	C	5	1	1		1												
India (French):																		
Chandernagor	C	1	2	1		1	2	2	2	2	2	1			1		3	
	D		3	1		1	3	1	2	3	1						3	
Pondicherry	C	4	31	19	10	20	31	39	29	25	26	20	5	3			3	8
	D	4	21	11	10	9	6	9	6	5	4	3	1	3				
India (Portuguese)	C		1															
Indo-China (see also table below):																		
Pnompenh	C	2		4		3	3	3					1	1				
	D	2		2		1	2	2		1					1		2	
Saigon and Cholon	C	3	9	6			3	1	1		1	3	2	3	7	15	25	
	D	1	4	3			3	1	2	1	1	1		3	6	13	20	

Persia: Rafsandjan	C																31	
	D																12	
Philippine Islands:[1]																		
Iloilo	C	1	1	2														
	D	3	1	2														
Provinces—																		
Capiz	C			59	69	54	28	35	29	11	4	4		3	8	18	11	3
	D			47	55	39	23	29	24	10	4	3		3	8	13	11	3
Iloilo	C	45	28	145	27	42	10	16	2	5								
	D	27	22	110	21	22	11	11	2	2								
Masbate	C								21									
	D								9									
Negros, Occidental	C	163	120	90	1	1	2											
	D	123	97	56	1	1	2											
Negros, Oriental	C			1														
	D			1														
Pampanga	C																1	
Samar	C	8	17															
	D	8	9															
Siam	C	6	2	3		1				4	4	2	1				11	
	D	6	2	1						1	1						3	
Ayudhaya District	C											1						
Bangkok	C	4	2	3	1			1		1	1	1	1		1		1	
	D	4	2	1				1		1	1				1			
Bismulok Province	C									4	4							
	D									1	1							

Place		October, 1930	November, 1930	December, 1930			January, 1931			February, 1931			March, 1931		
				1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-28	1-10	11-20	21-31
Indo-China (French) (see also table above):															
Cambodia[2]	C	22	26	28			7	19	36		35				65
Cochin-China[2]	C	28	13	8			7	4	13		5				33

[1] Figures for cholera in the Philippine Islands are subject to correction.
[2] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths, P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931 14	21	28	March, 1931 7	14	21	28	April, 1931 4	11	18	25	May, 1931 2	9	16	23
Algeria:																			
Algiers	C	2	1	2	1							1							
	D											1							
Bone	C			1															
Constantine, vicinity of	C		50	1	1														
	D			1															
Philippeville	C		1																
	D		1																
Argentina:																			
Cordoba Province	C			1		2													
Entre Rios Province—Diamante	C						2												
Jujuy Province—Palpala	C			1		1													
Santa Fe	C					2													
Belgian Congo	C	1								2									
	D	1								2									
British East Africa (see also table below):																			
Tanganyika	C	3	2				15	7		8								5	
	D	3	2				4			1								2	
Uganda	C	111	67	25	6	4		5	4	7	4								
	D	112	67	24	6	4		5	4	7	4								
Ceylon: Colombo	C	9	9	8	6	2	1	2	1	3	3	1	1	3			1		
	D	8	9	6	7	2	1	3	1	3	2	1	1	2			1		
Plague-infected rats		2		2	1	1	1			3	1			1					
China: Amoy	C																1		
	D																1		
Dutch East Indies:																			
Batavia and West Java	C	208	239	180	29	36	46	30	18	31	23	12							
	D	206	238	168	29	35	46	28	17	28	23	12							
East Java and Madura	C			4			1		1		1	2							
	D			4			1		1		1	2							
Java and Madura	D	557	615	427	89	108	99	80	65	81	68	63	58	73					
Egypt:																			
Alexandria	C	4	3	1	1			1	1										
	D	1																	
Plague-infected rats		3	1	1		1													

Assiout	C	9	7	26	9		17	15	6	10	1	1	5	16	8	3	4	5	1
	D	1	1	6	4		3	4		4	1	1		11	4	2	2	4	8
Aswan	C	3																	
Beni-Suef	C			1											10	2	3		2
	D			1											3		1		2
Cairo	C											1							
Deirout	C			21	6	10										3	7	1	
	D			4		4										1	2	2	
Gharbieh	C			1															
	D			1															
Girga	C		7	1						14	37	35	31	9	4		1	1	5
	D		2	1						2	5	17	13	3	5	1	1	1	
Kena	C										5				3				1
	D										2				1				1
Manfalut	C		23	30	11		2	2	3	5	9								
	D		5	6	4		1			2	1								
Minieh	C	1		2						2	1			1			5		1
	D			1						1	1						2		1
Greece (see table below).																			
India	C	3,259	3,740	5,335	1,270	1,095	1,726	1,366	2,674	2,271	2,462	1,732							
	D	1,856	2,226	3,422	862	774	1,213	812	1,887	1,624	2,009	1,526							
Bassein	C		2	4				1								1			
	D		1	3	1											1			
Bombay	C			1	1				1	1	1	1	4	4	1	2	5		
	D			1	1					2	1		4	4		3	4		
Plague-infected rats		32	38	34	14		8	10	17	14	21	18	31	43	30	30			
Calcutta	C												1	1					
	D												1	1					
Madras Presidency	C	148	220	312	30	19	13	12	9	12	7								
	D	78	154	182	17	18	7	4	4	12	5								
Rangoon	C		2	2							1		1				1		
	D		1	1							1		1				1		
Plague-infected rats		4	2	4		8						1	1	3			1		
Indo-China (see also table below): Pnompenh	C	6	1	7				1											
	D	6	1	7		1	2	1	2	1	1	2	2	1	1				
Iraq: Baghdad	C	4		5			1	2	1	3	3	1		5	10	8	7	10	4
	D	2		4				2		3	1	1		2	5	1	3	4	2
Madagascar (see also table below). Tamatave	C	4	2	9															
	D	3																	
Morocco	C		19	13															
	D		8	4															
Nigeria: Lagos	C	9	5	1									2		1				
	D	9	5	1									2		1				
Plague-infected rats		5	5																
Peru (see table below).																			
Senegal (see table below).																			
Siam	C			4	5	9	3	1	2	2			1						
	D			2	4	6	4		1	1			1						
Bangkok	C	1	3	8	1	2	3		29										
	D	1	3	8		1	4		6										
Nagara Rajsima	C	11	17	9	7						1								
	D	9	10	10	6														

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931: 14	Feb. 21	Feb. 28	March, 1931: 7	Mar. 14	Mar. 21	Mar. 28	April, 1931: 4	Apr. 11	Apr. 18	Apr. 25	May, 1931: 2	May 9	May 16	May 23
Syria: Beirut	C		1	1		1													
Tripolitinia	C	13		8		1			1										
	D	1		3															
Tunisia: Tunis	C	P	13	1		9	2	3		5		5	5	7		4			
	D					7						4	4	2		2			
Union of Socialist Soviet Republics:																			
Gouranduz	D			28															
Transcaucasia—Karabakh	C			6															
Union of South Africa:																			
Cape Province	C	P										2							
Orange Free State	C		2	P	P	1	P		2		4	P	1	1					
	D		2			1					1		1	1					
On vessel: S. S. Marionga de Thermiotis at Avonmouth	C		1																

Place		Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931
British East Africa (see also table above):							
Kenya	C	58	62	50	69	21	7
Greece	C	2					
Indo-China (see also table above)	C	2	5	1			4
Madagascar (see also table above):							
Ambositra Province	C	4	44	95	100	92	
	D	4	44	87	96	88	
Antsirabe Province	C	3	18	27	66	84	
	D	3	18	26	57	79	
Miarinarivo Province	C	18	12	18	28	31	
	D	18	12	18	26	29	
Moramanga Province	C	20	19	13	7	7	
	D	20	19	11	5	7	
Tananarive Province	C	125	170	178	92	145	
	D	116	164	172	89	139	

Place		Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931
Peru	C	42	34	41	29	12	
	D	20	14	13	8	6	
Senegal:							
Baol [1]	C	53					
	D	35	4				
Louga [1]	C	37	10				14
	D	25	3				6
Rufisque [1]	C					2	
Thies [1]	C	24	27	2			
	D	15	23	1			
Tivaouane [1]	C	53	21	2			
	D	31	25	1			

SMALLPOX

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended—													
					February, 1931			March, 1931				April, 1931				May, 1931		
					14	21	28	7	14	21	28	4	11	18	25	2	9	16
Algeria:																		
Algiers	C		1	1		1					2			2				
Bone	C			1														
Constantine	C									1							1	
Oran	C	3																
Arabia: Aden	C			1	1													
Belgian Congo	C		79	50														
Belgium	C				1													
Brazil:																		
Porto Alegre (alastrim)	C	36		3	1	1	2	3	7	12	16	14	20	19				
	D							1				1						
British East Africa (see also table below): Tanganyika	C	385	84	70	35	42	13	1	6	2								
	D	36	4	5		12	1		1	2								
British South Africa: Southern Rhodesia	C	18	18	13														
	D	3																
Canada:																		
Alberta	C	1	19	7	1													
British Columbia	C	1	3	2	1	2	5											
Manitoba	C			1			1										4	
Winnipeg	C		1				1											
Nova Scotia	C			1							1							
Ontario	C	23	17	49	10	4	7	8	2	3	3	1	4		6	7	17	5
Kingston	C		6	1		1									2	3		
North Bay	C		2		1													
Ottawa	C	12	2	3		1												
Sault Ste. Marie	C		1	30			2						3	1				1
Toronto	C	4							1		1			4			1	
Quebec	C	2		2														
Saskatchewan	C	18		38	17	18	18	10	40	10	8		5	16	3	22	7	15
Regina	C					1					2				2		2	
Canary Islands: Las Palmas	C										1							

1 Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931: 14	21	28	March, 1931: 7	14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9	16
China:																		
Amoy	C										1					2		
	D										1					1		
Canton	C				2			1	1	2	2	2	1	2	1			
Chungking	C	P	2															
Foochow	C	P	P	P		P		P		P		P	P					
Hong Kong	C		1	1	2	5		2			1	1		1	2			
	D				1	1	1				2				1		1	
Manchuria—																		
Harbin	C			1			4		1		1							
Kwantung—Dairen	C	4	1								2				1	1		
	D	1																
Nanking	C	P	P	P	P	P	P	P		P	P	P	P	P	P	P		
Shanghai—																		
Foreigners only	C	8	14	12	4	7	2	3	3	1	1	1	2	1	2	2	1	4
Including natives	D	4	11	13	5	2	4	3	5	2	2	1	2	7	4	5	1	
Swatow	D	3	5	7		3	3	7	3	6	9	8	2					
Tientsin	C	2		1														
Chosen (see table below).																		
Colombia: Cali	D	1																
Dutch East Indies: Java—Batavia and West Java	C	6	4	29		2			1									
	D	2	2	2	1													
France (see table below).																		
Great Britain:																		
England and Wales	C	508	665	958	221	50	247	227	171	219	226	179	177	163	212	192	186	
Bradford	C	1	1	4		1				1		1	1		1	4	1	
Leeds	C		2									1		1	1		1	
London	C	184	161	149	23	16	23	36	26	54	32	35	51	39	84	53	66	
London and Great Towns	C	433	560	693	150	186	189	158	117	154	166	117	142	126	162	128	139	
	D	1				1		[illegible]							1			
Sheffield	C			3		16	6	10	2	1	6	1	4	2	1			
Stoke-on-Trent	C			1				1										

Greece (see table below).																		
Honduras:																		
Amapala	C							1										
Ocotopeque and Gracias districts	C							P										
Puerto Castilla	C		4	11	3													
Tegucigalpa	C														1			
Tela	C												1					
India	C	3,627	5,623	9,623	2,996	2,766	3,003	3,457	3,440	1,695	3,395	3,231						
	D	874	1,381	2,245	665	620	706	669	455	303	655	438						
Bombay	C	1	2	7		1	3	2	4	1	4	1	2	2	1	3	3	
	D	1	2	1		1	1	1		1	2	1	1			4	1	
Calcutta	C	18	59	143	35	51	83	82	53	69	75	86	101	60	61	65	24	
	D	11	40	100	26	41	66	55	36	54	50	63	78	42	50	54	18	
Cochin	C	22	15	29	19		16	24	15	17	14		10	11	12	6	3	
	D	4	1		1		1	1										
Karachi	C	3		3			4			3		1		5		1		
	D	1		2							2							
Madras	C	20	4	16	4	1	3	1	6	3	9	4	12	4	1	2	1	
	D	3				1				2	1		2	1	1	1		
Moulmein	C			2														
Negapatam	C	6											1	1		1		
Rangoon	C	1			2		1	1	1	1	1		2	2	1	6	7	
	D								1							1	2	
Vizagapatam	C			1			8		1		1		2	2	4	2		
	D						2				1		1		1			
India (French):																		
Chandernagor	C		5	9	2		6	6	3	3	6	2	3	1			3	
	D		3	1			1					2	3	1			3	
Karikal	C		3	5	2		16	1			3			1			1	
	D		2	4	2		16							1			1	
Pondicherry Province	C	19	34	45	1	1	10	7	7		4	3	3			3	1	2
	D	17	32	45	1	1	10	7	7		4	3	3	3		3	1	2
India (Portuguese)	C		4	5	2	3	6	3		3	5							
	D				2		1			1	2							
Indo-China (see also table below):																		
Pnompenh	C	1	2	1					1									
	D	1		1														
Saigon and Cholon	C	2		6		2	2		4	1	1	2	1					
	D	2		4			1		3	1	2	2	1					
Iraq:																		
Baghdad	C						3	6							1	1		
Mosul Liwa	C	16	1	3		5												
	D	2				1												
Ivory Coast (see table below).																		
Japan:																		
Kobe	C						1	1										
Taiwan	C			1														

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931 14	21	28	March, 1931 7	14	21	28	April, 1931 4	11	18	25	May, 1931 2	9	16
Mexico (see also table below):																		
Jalisco (State)—Guadalajara	D	3		1							1					1	1	
Mexico City and surrounding territory	C	6	10		7	5		11	13	13	7		17	9	11	6		
	D	6	6	1	1	3	2	2	5	5	6	6	4	6	4			
Torreon	C													1				
	D													2				
Vera Cruz	C				1		1	1		1	1			1		1	1	
Morocco (see table below).																		
Nicaragua: Porto Cabezas	C		2															
Nigeria: Lagos	C										2							
Panama Canal Zone	C			2														
Poland	C	3	25			1												
Portugal: Lisbon	C	37	72	103		12	19	9	16	15	17	4	8	18	11	19		
Siam	C		1	4	1	1												
Somaliland, British: Boales	C	1																
	D		1															
Spain	C	P	P	P	P	P	P	P	P	P	P							
Straits Settlements	C	17	6	7			2				2	1	1		1			
	D	7	3	1			1				1		1	1				
Sudan (Anglo-Egyptian)	C	50	64	11	1	1	44	51	3	1	4					3		3
	D	5	6	7			6	4		1	1							
Sudan (French) (see table below).																		
Syria (see table below).																		
Tunisia: Tunis	C		17	8							4							
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P				P			P	P						
Orange Free State	C	P		P			P	P			P	P						
Transvaal	C	P	P	P	P	P	P	P	P		P							
Upper Volta	C	6	4			8	10				3			3			1	
	D		2								1							

On vessel:																	
S. S. Clan Mactoggart at Suez. C				2													
S. S. Muncaster Castle at Manila from Hong Kong. C		1															
S. S. Matheran at Suez from Calcutta. C			1														
S. S. Clan Buchanan at Suez. C						2											
S. S. Rotterdam at Naples from Venice. C										1							
S. S. Clan McTavish at Manila from Chittagong. C													1				
S. S. Benvenue at Sydney from Shanghai. C			1														
S. S. Clan MacBrayne at Cochin. C				1													
S. S. Chilka at Rangoon. C					1												
S. S. Taif (pilgrim ship) at Suakin from Jeddah. C															1		

Place	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931
British East Africa (see also table above):						
Kenya. C		653				
Chosen. C	22			1		11
D	6			1		3
France. C				4	16	

Place	Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931
Greece. C			4		4	
Mexico (see also table above). D	893		1		3	
Morocco. C	4	20	25		4	6
Turkey. C	74	65	116		37	1
D	1	1	9		6	

Place	October, 1930	November, 1930	December, 1930			January, 1931			February, 1931			March, 1931		
			1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-28	1-10	11-20	21-31
Indo-China (see also table above). C	258	86	38	9	14	47	48	46	95	46	27	125		139
Ivory Coast. C	4	2	9											
Sudan (French). C	17		43		96							4		P
D	2		16		4									
Syria: Beirut. C							1							

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931			March, 1931				April, 1931				May, 1931		
					14	21	28	7	14	21	28	4	11	18	25	2	9	16
Algeria:																		
Algiers	C	2			1	1					3				2	1	3	
Constantine Department	C	2	6	31			4			1		2	2		6	1	8	
Oran	C	5		3				1							1			
Australia; western	C											1						
Bulgaria	C	11	3	13		2		3				9		26	4			
	D		1									2		3				
Chile: Valparaiso	D									1								
China:																		
Canton	C			2					1									
Manchuria—Harbin (see also table below)	C	1		3			5				3							
Shanghai	C			2														
Tientsin	C	1											1	1				
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C	2												1				
	D														1			
Beheira Province	C		1										3	1				
	D		1										2					
Cairo	C	1	1	1														
Port Said	C			1														
Eritrea: Asmara	C								1									
Great Britain: Scotland	C			1														
Glasgow	C			2														
	D			1														
Greece (see table below):																		
Guatemala.[1]																		
Iraq: Baghdad	C				2	1	1	1	1								2	
	D				1												2	
Irish Free State:																		
Kerry County—Dingle	C																1	
Mayo County—Belmullet	C													1				

Latvia (see table below).																		
Lithuania (see table below).																		
Mexico (see also table below):																		
Durango	D			1														
Mexico City, including municipalities in Federal District	C	14	12	39	13	13	9		46	66	73	31	67	34	38	31		
	D	7		34	4	7	5		26	13	31	20	18	7	17	14		
San Luis Potosi	D	2			2	2		1	1	1	2	1	1	2				
Morocco	C	1	8	8	7	8	5	8	2	2	3			1		12		
	D			2		1										1		
Palestine	C	7	4	[illegible]	3				2	1	1	1	1	2		2	2	1
Panama Canal Zone—Balboa	C																	1
Paraguay: Asuncion	D			4														
Poland	C	42	63	106	9	41	43	56	62	58	85	82	93	176	110	129	92	
	D	7	3	8		3	4	9	4		7	4	8	7	6	7	6	
Portugal: Oporto	C	6		1														
Rumania	C	34	113	193	49	53	12	38	55	53	52	54	70					
	D	3	5	16	5	11	3	5	4	5	3	4	8					
Spain	C	1																
	D	1																
Syria	C																	3
Tunisia:																		
Sbeitla, vicinity of	C											20	2			10		
	D											7						
Sfax	C										2							
Tunis	C	28		16				12	5	2	7		2			10		
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P	1		P	P	P					
Municipality of East London	C	1	3	3							P	P						
Natal	C		P	P	P	P				1	P	P	P	P				
Orange Free State	C		P	P	P		P	P	P				P	P				
Transvaal	C	P	P	P	P	P	P	P	P		P	P	P	P				
Yugoslavia (see table below).																		

Place		Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Place		Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931
China: Harbin (see also table above)	C	3						Lithuania	C	1	5	6	26	3	22
Chosen: Seoul	C	7	1	1	1		3		D		1	3	3	1	2
Czechoslovakia	C		16	24	60	26		Mexico (see also table above)	D	47	47	47			
Greece	C	4	4	10	10	17	8	Turkey	C	28	3	2		18	
	D				2	2	1	Yugoslavia	C	2	2	1	20		
Latvia	C					12			D	1		1	2		

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reports an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases, D, deaths; P, present]

	Cases	Deaths
Brazil:		
Bahia State—		
Mar. 14, 1931	1	
Mar. 15-21, 1931	1	
Ceara State—		
Mar. 14, 1931	2	
Apr. 27-May 2, 1931	2	2
May 10-16, 1931	1	1
Barbalha, Feb. 7, 1931	1	1
Minas Geraes State—		
Mar. 20, 1931	2	1
Apr. 5-11, 1931	1	
Apr. 19-25, 1931	2	1
Apr. 26-May 2, 1931	2	1
May 3-9, 1931	1	1
May 17-23, 1931	1	
Brazil—Continued		
Rio de Janeiro State—		
Mar 7, 1931	1	1
Mar 14, 1931	1	1
Mar. 21, 1931	1	1
May 10-16, 1931	1	
May 17-23, 1931	1	
Cambucy—		
Jan 1-25, 1931	3	3
Feb. 1-7, 1931	1	1
Friburgo (imported), Jan 25-30, 1931	1	
Padua—		
Jan 18-24, 1931	1	1
Feb. 1-7, 1931	1	1
Feb 8-14, 1931	1	
British Cameroon: Mamfe, May 14, 1931	3	1

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SPECIAL ARTICLES

Summary of Current Prevalence of Communicable Diseases

Eastern Type Rocky Mountain Spotted Fever Transmitted by Dog Tick

Operation of the Standard Milk Ordinance in Missouri

UNITED STATES
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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of the public health.

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PREVALENCE OF DISEASE

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PUBLIC HEALTH REPORTS

VOL. 46 JUNE 12, 1931 NO. 24

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES[1]

April 26–May 23, 1931

The prevalence of certain important communicable diseases, as indicated by weekly telegraphic reports from State health departments to the Public Health Service, is summarized in this report. The underlying statistical data are published weekly in the Public Health Reports under the section entitled "Prevalence of Disease."

Meningococcus meningitis.—A decrease in the incidence of meningococcus meningitis was apparent in all geographic regions during the 4-week period ended May 23. The number of cases reported (573) was 71 per cent of the number reported in 1930, and only about 50 per cent of the number in 1929 for the corresponding period.

A possible exception to the favorable picture is seen in the South Atlantic States, where the number of cases for the current period is 33 per cent in excess of the number for the corresponding period of last year. This unfavorable comparison with last year is the result of a building-up process which has covered a period of several months, as is shown by the last line in the following table:

Cases of meningococcus meningitis reported from South Atlantic States

	4-week period ended—				
	Jan 31	Feb. 28	Mar. 28	Apr 23	May 23
Cases during period in:					
1931	46	75	68	64	60
1930	69	106	81	62	45
Ratio of 1931 cases to 1930 cases	0 67	0.71	0 84	1 03	1.33

The numbers involved are small, and meningitis is somewhat erratic in its movements, hence no forecast would be warranted at this time. Nevertheless the situation merits watching, not because of the immediate prospect, but because of possible developments next autumn and winter.

Poliomyelitis.—During recent months the poliomyelitis situation has been decidedly more favorable in relation to the preceding year than was the case last autumn. During the 4-week period ended May 23 the reported number of cases (87) was below the figure for the preceding year (93) for the first time in a year. In other words,

[1] From the Office of Statistical Investigations, U S. Public Health Service. The number of States included for the various diseases are as follows Typhoid fever, 47, poliomyelitis, 48; meningococcus meningitis, 48; smallpox, 48; measles, 45, diphtheria, 47, scarlet fever, 47, influenza, 39 States and New York City. The District of Columbia is counted as a State in these reports.

the epidemic wave appears to be on the wane, although a normal seasonal rise during the coming warm months is to be expected.

The West North Central group of States are a possible exception to the general favorable picture, 19 cases having been reported in this section during the last eight weeks as compared with 2 for the period last year. It is difficult to interpret these figures, however, as that region reported a very abnormal incidence in 1930, the number of cases actually having dropped to zero in the period ended April 21, 1930, six months before the crest of a heavy epidemic.

Scarlet fever.—The reported number of cases of scarlet fever (21,399) was about 35 per cent in excess of that for last year. In New England and in the Great Lakes region the excess approximated 40 per cent. This appears to have been a scarlet fever winter in all regions except the Mountain and Pacific.

Smallpox.—The current reported incidence of smallpox (3,423 cases) is about 62 per cent of last year's number. All regions share in this favorable comparison except the South Central States, which are about on a par with last year.

The reported attack rates show wide differences. Whereas the rate for the reporting area as a whole was 28 per million population, the individual regions rank as follows:

Reported cases per million population

West North Central	75.8
East and West South Central	41.3
East North Central	40.8
Mountain and Pacific	29.5
South Atlantic	3.0
New England and Middle Atlantic	1.1

Within the individual regions, there are wide variations also.

Typhoid fever.—The reported incidence of typhoid fever (717 cases) was less than in the corresponding period of either of the last two years.

Influenza.—The influenza outbreak of last winter and spring has largely abated in most regions, although the current reports (3,983 cases) are still 24 per cent in excess of last year's experience. New England has declined to 0.6 of last year's level, but the remaining regions, particularly the West North Central group, still show signs of an excess.

Diphtheria.—For the country as a whole, the present year continues to maintain record breaking lows in diphtheria incidence. The number of reported cases (3,475) is about 86 per cent of last year's figure. The South Central and far Western groups, however, show excesses over last year of 18 per cent and 31 per cent, respectively.

Mortality, all causes.—The mortality in large cities reporting to the Census Bureau averaged 11.9 per thousand population, annual basis, as compared with 12.5 for the corresponding period last year.

ROCKY MOUNTAIN SPOTTED FEVER (EASTERN TYPE)

TRANSMISSION BY THE AMERICAN DOG TICK (*Dermacentor variabilis*)

By R. E. Dyer, *Surgeon*, L. F. Badger and A. Rumreich, *Passed Assistant Surgeons, United States Public Health Service*

A disease occurring in certain sections of the Eastern States has recently been described by the authors. The clinical similarity of this disease to Rocky Mountain spotted fever and its differentiation from endemic typhus, both clinically and epidemiologically, were pointed out (1). Immunologically, in animals, this disease is indistinguishable from Rocky Mountain spotted fever and distinct from both European and endemic typhus (Brill's disease). However, certain variations have been noted in animals inoculated with the virus of the disease recently described for the Eastern States when compared with animals inoculated with a strain of Rocky Mountain spotted fever obtained from Montana. In general, these differences apparently indicate that the eastern type virus is somewhat less virulent than the western type virus with which it has been compared (2). With these differences in mind, it seems necessary at the present time to refer to the disease as noted in the East as the *eastern* type of Rocky Mountain spotted fever in contrast to the *western* type of the disease.

In 1902 Wilson and Chowning (3) (4) suggested that the spotted fever of Montana might be transmitted by the wood tick. In 1906 Ricketts (5) began the studies which definitely established the part played by the tick in the transmission of spotted fever. King (6), independently, transmitted the disease to guinea pigs by the bite of ticks. In 1908 McCalla (7) published the results of an experiment performed by Doctor Brereton and himself in Boise, Idaho, in 1905. He removed a tick from a spotted-fever patient and produced the disease in two volunteers by permitting the tick to feed upon them.

In 1907 Ricketts (8) allowed ticks (*Dermacentor andersoni*) in the nymphal stage to feed on guinea pigs infected with spotted fever. After moulting to the adult had taken place, these ticks were fed on noninfected guinea pigs, which developed spotted fever. In a subsequent publication Ricketts (9) showed that the tick *D. andersoni* may receive its infection in the larval stage and remain infective through the nymphal stage, and that the virus may also be transmitted by an infected female to her larvæ through the egg.

Ricketts's observations were of especial importance, since in nature it is probably very unusual for this tick to feed on more than one host in each stage of its existence. To be of importance in the transmission of spotted fever from animal to animal in nature, or from animal to man, the tick must receive its infection in one stage and transmit it in some subsequent stage or stages.

In 1909, Ricketts (10) reported the successful transmission of spotted fever by *Dermacentor modestus* and, in 1911, Maver (11) reported the transmission of the disease by the American dog tick, *Dermacentor variabilis.* In Maver's experiments the ticks were infected in the larval stage and transmitted the disease in the nymphal stage and later in the adult stage. She also showed that *Dermacentor marginatus* and *Amblyomma americanum* could be infected in the larval stage and later transmit the infection in the nymphal stage.

As a part of the studies on the spotted fever type of infection reported by the authors (1) (2) as occurring in the eastern part of the United States, attempts have been made to transmit this type of the disease by the American dog tick (*Dermacentor variabilis*). This tick has a wide distribution in the eastern part of the United States and is the common tick in the areas where the eastern type of spotted fever has been found.

Larvæ from one female tick (*Dermacentor variabilis*) were fed on a guinea pig (H–70) which had been inoculated with virus from the H strain isolated from a human case of the eastern type of spotted fever (2). The original female tick from which these larvæ were derived was secured, already engorged, from a section of northern Virginia where spotted fever (eastern type) was known to be present. Since all of the larvæ from this tick were fed on the infected guinea pig it can not be stated definitely that this tick was not already infected when found. Guinea pig H–70 developed a febrile reaction on the day the larvæ were applied and died eight days later. The engorged larvæ recovered from guinea pig H–70 were stored to await moulting. Approximately one month after moulting from larvæ the nymphs were placed for feeding on a fresh guinea pig. This guinea pig developed a febrile reaction three days after the nymphs were attached and died eight days later. Four engorged nymphs were taken after dropping from this guinea pig, emulsified in 4 cubic centimeters of normal saline, and 2 cubic centimeters of the emulsion injected into each of two fresh guinea pigs. One of these guinea pigs developed a fever in 24 hours and died four days after inoculation. The second guinea pig developed a febrile reaction 48 hours after receiving the inoculation of nymph emulsion. On the third day of fever this animal was killed and heart's blood and brain emulsion were used to inoculate fresh guinea pigs. The strain of virus thus established has been continued in guinea pigs and is at present in its nineteenth "generation."

The reaction of guinea pigs to this tick-passage virus is apparently identical with the reaction noted in guinea pigs after inoculation with the original eastern type virus isolated from human blood and maintained in guinea pigs and monkeys.

This original virus will be referred to as *guinea pig-passage virus.* Brains from 13 "tick-passage" strain guinea pigs have been examined

microscopically. Two showed no lesions; in five, a few lesions of rather indefinite character were present; while in the remaining six, definite lesions were demonstrated which were described by Passed Asst. Surg. R. D. Lillie as follows:

Guinea pig 1490

Brain: Dense lymphocyte infiltration in sheaths of many vessels in pons, cerebellum, medulla, midbrain, cerebrum including basal ganglia and hippocampus, and thalamus. Many small compact foci of cellular gliosis, often paravascular, in pons, cerebellum, medulla, midbrain, thalamus, basal ganglia, and cerebral cortex. Vessels with adventitial infiltration are often partly occluded by endothelial swelling.

Lesions are most numerous in pons and cerebellum, least in the parietal cortex, and hippocampus and thalamus.

Guinea pig 1513

Brain: Pericapillary adventitial lymphocyte infiltration and fibroblast proliferation and foci of cellular gliosis are numerous in pons and cerebellum, somewhat less frequent in other parts of the brain. Moderate meningeal round cell infiltration and considerable diffuse cellular degeneration are seen.

Guinea pig 1689

Brain: Cerebellum and pons show slight lymphocyte infiltration in sheaths of several small vessels, more marked infiltration about vessels in pia and three small compact focal cellular glioses are seen. Other areas show no intracerebral lesions.

Guinea pig 1817

Brain: Numerous typical small and medium sized focal glioses and many capillaries with adventitial proliferation or lymphocyte infiltration in cerebellum and pons, few in medulla, thalamus, cerebral cortex, and midbrain, none in basal ganglia. Scanty lymphocytes in pia.

Guinea pig 1841

Brain: Two capillaries in basal part of frontal cortex show a layer of lymphocytes in their sheaths, one with a small paravascular gliotic focus; two capillaries in the thalamus show one to two layers of lymphocytes in their sheaths; one similarly mantled capillary and one focal gliosis in the midbrain.

Guinea pig 1842

Brain: A typical small focal cellular gliosis is seen in the pons, a capillary with endothelial proliferation and marked narrowing of the lumen, adventitial fibroblast proliferation and slight lymphocyte infiltration and a paravascular cellular gliotic focus in the molecular layer of the cerebellar cortex. Adventitial lymphocyte infiltration in the sheath of a capillary in the medulla, a small focal gliosis in the white substance of the upper cervical cord, a few lymphocytes in the sheath of a midbrain capillary, a small focal gliosis in the temporal cortex, lymphocyte infiltration in the sheaths of a small vessel in the parietal cortex, of two in the corpora striata and of two in the frontal cortex, and slight patchy lymphocyte infiltration and pericapillary fibroblast proliferation in the pia, most marked over the sides of the cerebellum, scanty elsewhere.

Monkeys (*Macacus rhesus*) inoculated with tick-passage virus have developed the disease, and the virus has been recovered from two of these monkeys and reestablished in guinea pigs. The febrile reactions of four monkeys following inoculation with tick-passage virus are shown in Charts 5, 6, and 7 (monkeys 384, 389, 382, and 426). The development of agglutinins for *B. proteus* X_{19} (type 0) by these mon-

keys is shown in Table 1. Two of the monkeys developed rashes, limited to the face in both instances. In one, the rash was macular, while in the second the rash was petechial, being especially prominent on the eyelids. Histological examination, by Passed Assistant Surgeon Lillie, of sections of the skin showing the petechial rash revealed the following:

Monkey 389:

Skin: Numerous capillaries show adventitial lymphocyte infiltration and fibroblast proliferation. Thrombosis, endothelial necrosis and pericapillary hemorrhage are absent. Spindle-shaped finely granular mast cells are often seen in the zones of adventitial proliferation and elsewhere.

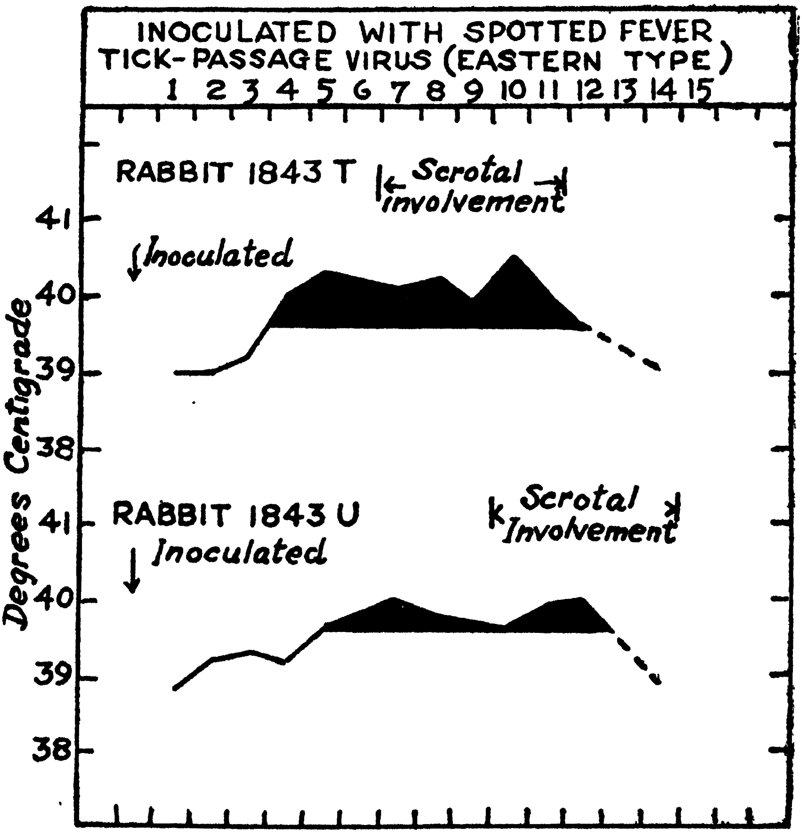

CHART 1.—Daily temperature records

Two rabbits inoculated with the tick-passage virus developed febrile reactions shown in Chart 1. Both of these rabbits showed involvement of the scrotum to the extent of redness and swelling. The process in the scrotum did not proceed to ulceration and sloughing as noted in rabbits following inoculation with the guinea pig-passage virus (2).

The agglutinin response for *proteus* X_{19} (type 0) of the sera of these rabbits is shown in Table 1.

Table 1.—*Agglutination of proteus X_{19} (type O) by sera from monkeys and rabbits which had been inoculated with spotted fever, eastern type, tick-passage virus*

Animal	Day after inoculation	Serum dilutions [1]							
		10	20	40	80	160	320	640	1280
Monkey 382	0	3	3	2	1	0	0	0	0
	Sixth	0	2	3	3	1	0	0	0
	Thirteenth	0	0	3	4	4	2	0	0
	Twentieth	0	1	4	4	4	3	2	0
	Twenty-seventh	2	3	4	4	4	2	0	0
	Thirty-fourth	3	4	4	3	2	0	0	0
Monkey 384	0	2	0	0	0	0	0	0	0
	Sixth	0	0	0	0	0	0	0	0
	Eleventh	3	4	3	2	0	0	0	0
	Seventeenth	4	4	4	4	2	1	0	0
	Twenty-third	3	4	4	2	1	0	0	0
	Thirtieth	2	2	2	1	0	0	0	0
	Fourty-fourth	3	2	2	0	0	0	0	0
Monkey 389	0	3	3	2	0	0	0	0	0
	Seventh	3	3	2	1	0	0	0	0
	Seventeenth	4	4	4	4	4	4	4	2
	Twenty-ninth	3	4	4	4	4	3	2	0
	Fourty-first	4	4	4	3	0	0	0	0
	Sixty-ninth	2	2	2	0	0	0	0	0
Monkey 420	0	3	3	3	2	1	0	0	0
	Sixth	3	3	2	2	1	1	0	0
	Thirteenth	4	4	4	2	0	0	0	0
	Twentieth	3	4	4	4	4	1	0	0
	Twenty-seventh	3	4	4	4	4	1	0	0
	Thirty-fourth	2	2	1	0	0	0	0	0
Rabbit 1843-T	0	0	0	0	0	0	0	0	0
	Seventh	0	0	0	0	0	0	0	0
	Fourteenth	4	4	3	0	0	0	0	0
	Twenty-first	4	4	2	0	0	0	0	0
	Twenty-eighth	4	3	2	0	0	0	0	0
Rabbit 1843-U	0	2	0	0	0	0	0	0	0
	Seventh	0	0	0	0	0	0	0	0
	Fourteenth	0	0	0	0	0	0	0	0
	Twenty-first	0	0	0	0	0	0	0	0
	Twenty-eighth	1	0	0	0	0	0	0	0

[1] 4=complete agglutination; 3=incomplete; 2=partial, 1=trace.

CROSS IMMUNITY TESTS

Guinea pigs which had developed febrile reactions following inoculation with tick-passage virus were subsequently found to be immune to the spotted fever (eastern type) guinea pig-passage virus. Similar guinea pigs were found to be immune to a strain of the western type of spotted fever obtained from Montana. Two guinea pigs inoculated with vaccine prepared in Montana, from western spotted fever virus (12), and subsequently found immune to spotted fever (eastern type) guinea pig-passage virus, were later found to be immune when inoculated with the tick-passage virus. In each immunity test fresh animals were used as controls. Results of these tests are shown in Charts 2, 3, and 4.

Two of the four monkeys inoculated with spotted fever tick-passage virus (eastern type) have been tested for immunity to the western type of spotted fever. One of these monkeys (389) was inoculated with tick-passage virus from a guinea pig in the eighth generation from the tick, while a guinea pig in the ninth generation was used as a source of virus for the second monkey (384). Both of these monkeys were tested separately for immunity to the western type of

spotted fever. Their immunity is shown in Charts 5 and 6. Control monkeys are shown in both charts. At the time monkey 384 was tested for immunity to the western type virus a second monkey (387) was also tested and found immune. Monkey 387 had previously reacted to an injection of spotted fever (eastern type) guinea pig-passage virus. The temperature record for this monkey is also shown in Chart 6.

Two monkeys (347 and 348) and two guinea pigs (T-72 and T-81) inoculated with the eastern type guinea pig-passage virus were subsequently tested for immunity to the eastern type tick-passage virus.

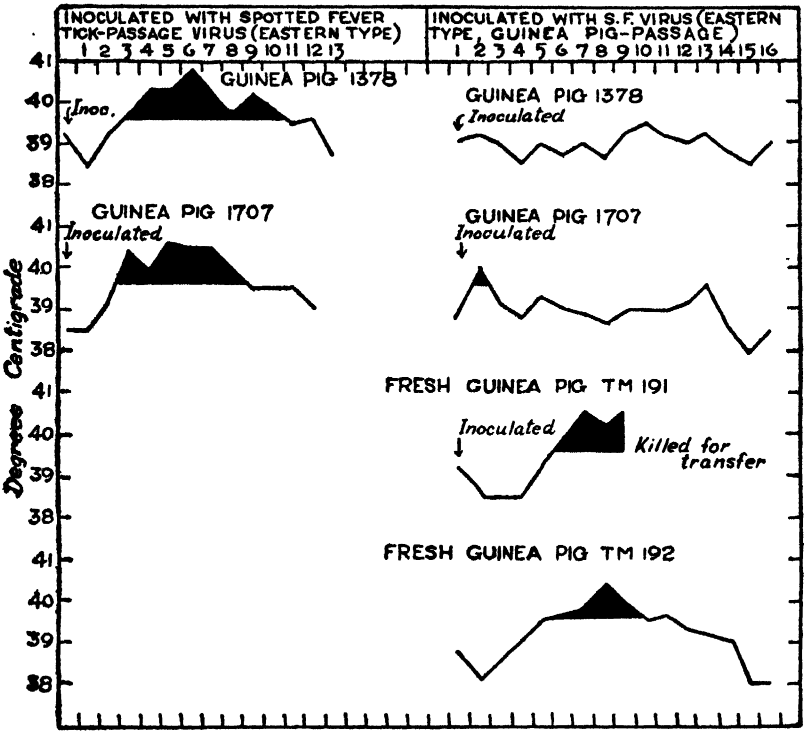

CHART 2.—Cross immunity test. Daily temperature records

The monkeys had been found immune to western type virus subsequent to their reaction following inoculation with eastern type guinea pig-passage virus and prior to being tested with the tick-passage virus. Two fresh monkeys (382 and 426) and four fresh guinea pigs (1841, 1842, 1843, and 1844) were used as controls in the final immunity test. Blood virus from one guinea pig in the fifteenth generation from the tick was injected into all animals. Control guinea pigs 1841 and 1842 were killed at the close of the febrile reaction and histological examination of the brains was made. This examination showed a few lesions in each brain. (See preceding histological reports.)

Temperature reactions following the inoculation of animals in this test are shown in Chart 7. Notations of the agglutinin response of each monkey appear on this chart.

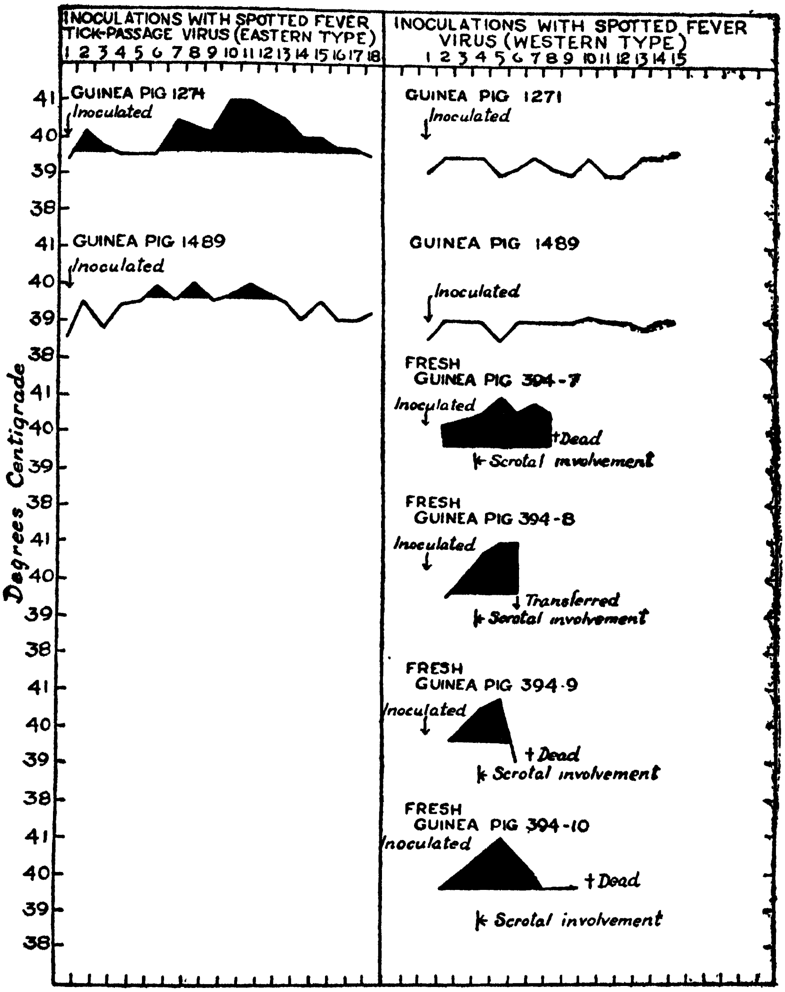

CHART 3.—Cross immunity test. Daily temperature records

SUMMARY

(1) A female tick (*Dermacentor variabilis*) was obtained from a district where human cases of the eastern type of spotted fever were occurring.

(2) Larvæ from this female were fed on a guinea pig infected with the eastern type of spotted fever. After engorgement on the infected guinea pig these larvæ were allowed to moult to nymphs. The nymphs were fed to engorgement on a noninfected guinea pig

and were then ground up and injected into fresh guinea pigs. This resulted in establishing a strain of virus in guinea pigs.

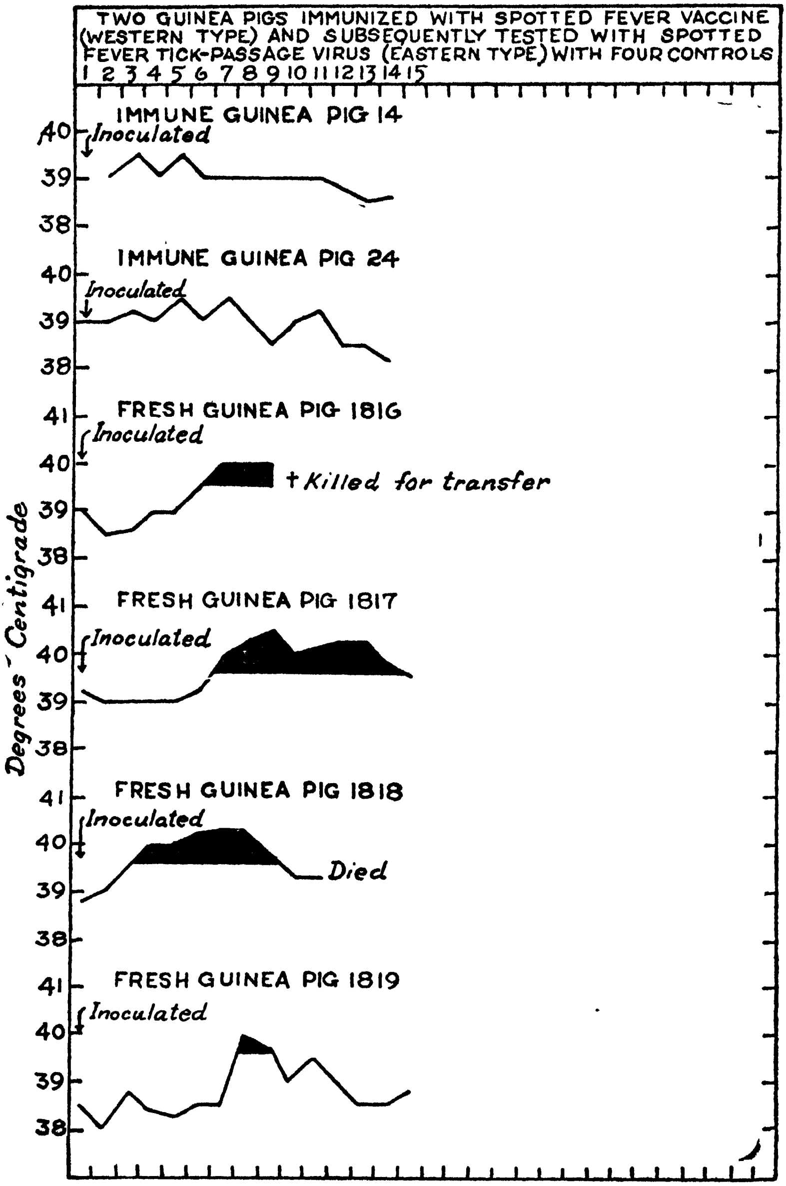

CHART 4.—Cross immunity test. Daily temperature records

(3) Reports of histological studies of the brains of guinea pigs inoculated with spotted fever, eastern type, tick-passage virus are given.

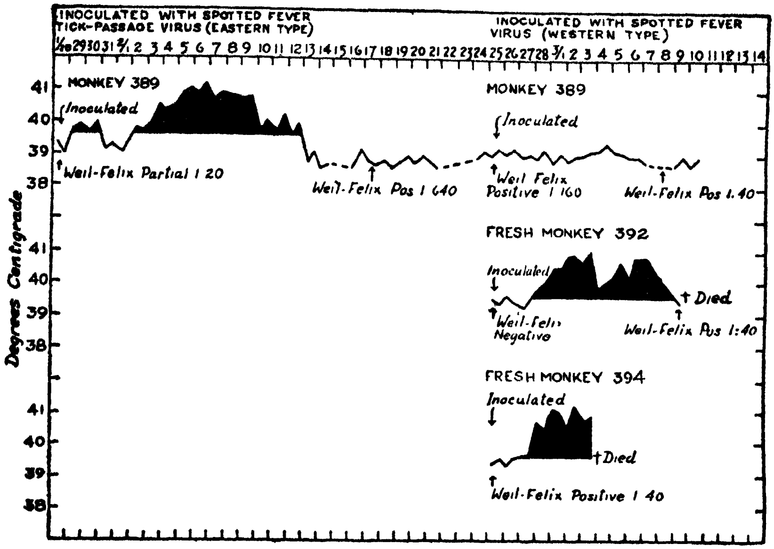

CHART 5.—Cross immunity test. Daily temperature records

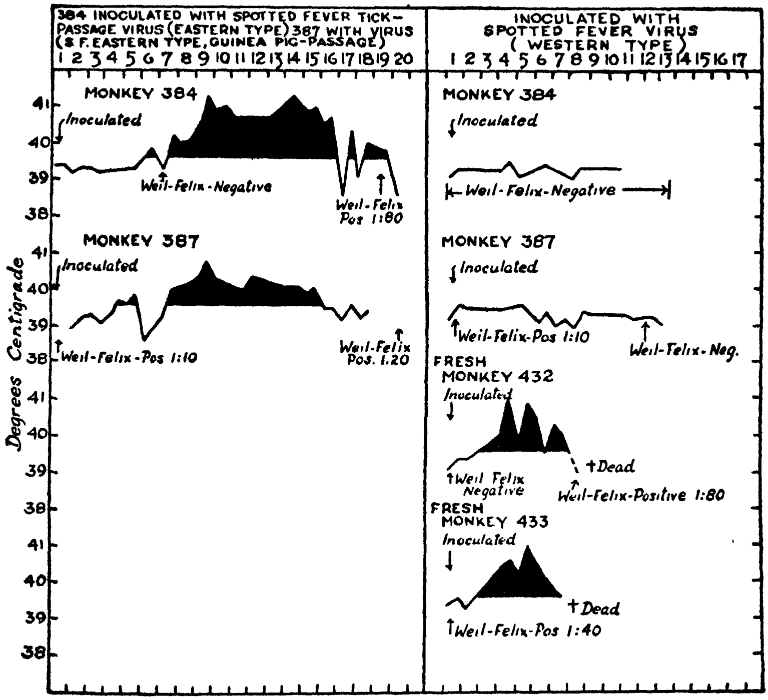

CHART 6.—Cross immunity test. Daily temperature records

(4) The production of agglutinins for *B. proteus* X_{19} in monkeys inoculated with spotted fever, eastern type, tick-passage virus is shown.

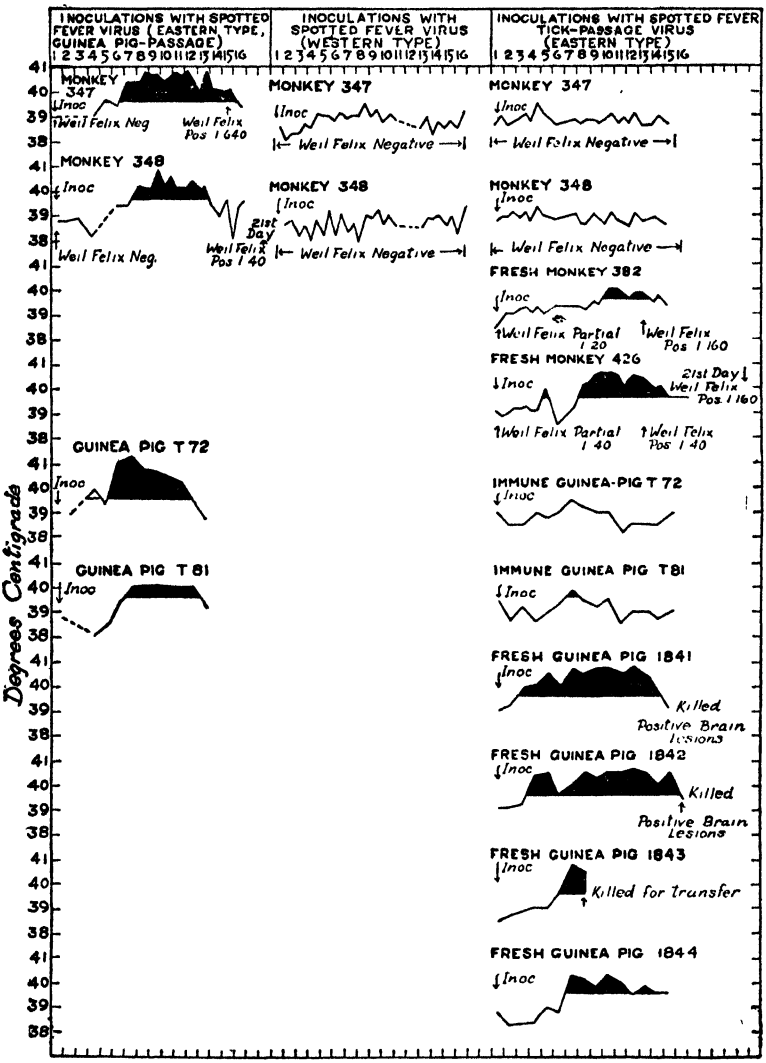

CHART 7.—Cross immunity test Daily temperature records

(5) Results of cross immunity tests between both the western and eastern types of spotted fever and the virus recovered from the nymphs are shown.

CONCLUSION

The virus of the eastern type of Rocky Mountain spotted fever is preserved in the body of the American dog tick (*Dermacentor variabilis*) through at least one moult.

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RESULTS OF THE OPERATION OF THE STANDARD MILK ORDINANCE IN MISSOURI

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HISTORICAL REVIEW

Early efforts toward a milk sanitation program.—The first activities of the State Board of Health of Missouri directed toward the improvement of municipal milk sanitation were inaugurated in 1923 under the direction of the division of sanitary engineering with the aid of a scientific assistant detailed from the United States Public Health Service. Endeavors in this direction were deemed warranted principally for the following reasons:

1. A high infant mortality rate.
2. Requests from several unofficial civic organizations, such as commercial clubs and parent-teacher associations, for information regarding the quality of their respective city milk supplies.
3. Requests from city officials for assistance and advice relative to certain problems in milk sanitation.
4. Information from various sources indicating unsatisfactory or no city milk ordinances in many instances and ineffective enforcement of existing ordinances in practically every city investigated.

The program which the State board of health developed to improve city milk sanitation was fundamentally a plan for advisory assistance to the cities in controlling the sanitary quality of their milk supplies. To this end, the assistance of the State board of health was made available only to those cities that requested it. Following such a

request a complete sanitary survey of the milk supply was made. This survey included an inspection of the dairies and milk plants serving a given city, and bacteriological analyses of samples of milk. The latter work was accomplished by means of a portable field laboratory. In conjunction with this survey, meetings with the dairymen and other interested organizations were held for the purpose of discussing milk sanitation. Following the survey, a report setting out in detail conditions found and making recommendations for their improvement was submitted to the city officials.

A "model milk ordinance" was developed, and the passage and enforcement of this ordinance was recommended to all cities surveyed. This model milk ordinance provided that the milk be graded on the basis of the bacterial count only. Farm and plant items of sanitation were mandatory for all milk sold and did not enter into the grading procedure. The only penalty provided for violation was revocation of the permit or court prosecution.

The program did not include regular follow-up inspections by the State board of health, and no particular effort was made to maintain uniformity of the "model ordinance" by all the cities passing it. A city milk inspector and laboratory facilities were obviously deemed necessary, and provision was made for them by each of these cities.

During approximately 12 months fairly satisfactory results were secured, although the time involved in making the surveys and securing laboratory data was rather excessive. Surveys were made in six cities during this period and the passage of the ordinance secured in four. In these four cities the work was started under particularly propitious circumstances as regards personnel and laboratory facilities. Owing to the loss of the United States Public Health Service representative, only occasional and superficial contacts were made with these four cities after the ordinance was passed, and no further milk work in new cities was undertaken in the State until 1925. The inspectors in the four cities were interviewed relative to the progress made from time to time. However, no additional check surveys were made of the dairies or plants, and no positive efforts were made to determine the effectiveness of the ordinance.

In general, these early efforts emphasized to the State board of health the following well-defined requirements of a satisfactory State milk sanitation program:

1. Frequent advisory assistance to the cities.
2. An ordinance so designed that the sanitary quality of a city milk supply may be gradually improved without placing undue burdens on the individual dairyman, and so that it appeals to the average councilman as being fair to all concerned.
3. An ordinance that may be adequately enforced with minimum recourse to the courts.

4. Adequate State personnel to advise and assist the local milk inspectors.

Adoption of Standard Milk Ordinance and its development.—In 1925 the United States Public Health Service Standard Milk Ordinance was adopted by the State board of health for the following reasons:

1. The fact that the milk sanitation problem had not been adequately solved by the previous program.
2. Milk-borne typhoid fever epidemics were being brought to the attention of the State board of health with increasing frequency.
3. The Standard Milk Ordinance and its program of enforcement constituted a remedy for most of the difficulties encountered in the previous state-wide program, and was the most effective method of milk sanitation control available.

(For a thorough discussion of the Standard Milk Ordinance and the unification control program, reference is made to United States Public Health Service Reprint No. 1098.)

During the next two years the Standard Milk Ordinance was passed in five cities and has continued in force in these cities with increasing effectiveness each year.

The Standard Milk Ordinance proved easy to pass and to enforce, and was effective in securing a reasonably rapid improvement in quality, as well as a marked increase in the per capita consumption of milk. Probably most important is the fact that the plan of State and Federal assistance and ratings promotes adequate local enforcement.

STATE ORGANIZATION AND METHODS FOR ENFORCING THE STANDARD MILK ORDINANCE PROGRAM

The plan of procedure beginning September 1, 1928, did not vary from the former work under the Standard Milk Ordinance except that the program was expanded and more careful supervision was possible, owing to the fact that two men (one from the Public Health Service) were assigned to the work.

In August, 1928, letters were sent to a selected group of cities, with the information that the services of two milk specialists would be available to aid them in case they desired assistance. With the exception of two cities, where milk-borne typhoid epidemics occurred, no cities have been approached other than those voluntarily requesting aid.

About one-third of the State program was devoted to interesting additional cities in the passage of the ordinance. A third of the time of the personnel was allotted to the training of city milk inspectors in the enforcement of the Standard Milk Ordinance. The remaining time was devoted to routine surveys of the work of the

Standard Milk Ordinance cities, and to special problems. It was not found possible to survey the cities oftener than once each three months.

Interest in milk sanitation in several cities was aroused through the cooperation and assistance of local nonofficial organizations, such as chambers of commerce, parent-teacher associations, etc. It is believed that the support of these nonofficial organizations can be very valuable, particularly after the milk ordinance has been passed.

It is of first importance, once a milk ordinance is passed, that it receive satisfactory and continuous support from city officials and from as many citizens as possible. The nonofficial organizations serve to secure this support if properly approached.

In two instances the local full-time county health unit enforces the Standard Milk Ordinance in the smaller municipalities within the county. The problem of the cost of enforcement in small municipalities is frequently a controlling factor in the passage of a milk ordinance. Where it is possible to group the enforcement in several small municipalities under one inspector, this objection is eliminated. The sanitary inspector of the county health unit has proved by training and position to be the logical individual to enforce the milk program in the small municipalities within the county.

GENERAL DISCUSSION OF STANDARD MILK ORDINANCE CITIES

Prior to March 1, 1930, 19 Missouri cities had adopted the Standard Milk Ordinance. The 1930 population of these cities and the date of passage of the standard ordinance are given in Table 1.

TABLE 1.—*Population of cities and date the Standard Milk Ordinance was passed*

City	Population (1930 census)	Date standard ordinance passed	City	Population (1930 census)	Date standard ordinance passed
Ash Grove	1,116	Nov. 8, 1928	Marshall	8,080	June 17, 1929
Brookfield	6,365	Oct. 16, 1928	Moberly	13,647	May 6, 1929
Cape Girardeau	16,148	Apr. 1, 1929	Monett	4,099	June 7, 1929
Carrollton	4,054	May 21, 1929	Neosho	4,485	Oct. 1, 1929
Carthage	9,686	June 24, 1925	Republic	841	Aug. 5, 1929
Chillicothe	8,174	Apr. 15, 1929	St. Joseph	80,941	Dec. 24, 1928
Hamilton	1,571	May 28, 1929	Sedalia	20,806	Mar. 27, 1927
Hannibal	22,760	May 24, 1926	Springfield	57,527	Mar. 29, 1929
Independence	15,261	June 15, 1926	Trenton	6,980	May 8, 1929
Joplin	32,586	Aug. 3, 1926			

Five cities had adopted the Standard Milk Ordinance prior to September, 1928. Three additional cities adopted it in the fall of 1928. The majority of the remaining 11 cities passed the ordinance in the months of April, May, and June, 1929. In some of the smaller cities there was considerable delay in the appointment of an inspector, thus postponing active enforcement until the late summer and fall of 1929. Owing to a change of administration, two of the cities have not to date appointed an inspector.

Table 2 indicates the number of cities having full-time milk inspectors, and the number having various other arrangements:

TABLE 2.—*Type of milk inspection*

Cities with full-time dairy inspectors	4
Cities with full-time health department employees, part-time on milk	4
Cities with full-time city employees, part-time on milk	3
Cities with part-time inspectors (practicing physicians)	1
Cities with part-time inspectors (practicing veterinarians)	3
Cities with part-time inspectors (others)	2
Cities with no inspectors	2

It will be noted that in only 11 of the 19 cities is the milk-inspection work done by personnel whose entire time is paid for by the city or county. In six cities there are part-time employees, and two of the cities have no inspectors.

In seven of the above-listed cities the milk-inspection work is part of the duties of a full-time city or county health unit. The remaining 12 cities have only part-time health officers.

The inspectors in only 4 of the 19 cities had had previous experience in the fundamentals of milk sanitation.

It is realized that the success of a local milk sanitation program is directly proportionate to the qualifications of the local inspector, and to the support and direction he receives from his superiors or from the State health department. However, the acceptance of partially trained inspectors was unavoidable in most of the cities, and it was decided that this at least provided an opening wedge which would probably lead to the development of better milk-control work in the future.

The Missouri experience has shown that far better results are possible with the available untrained personnel, through the system of State health department assistance, than could be obtained with the same type of personnel without such assistance. It has also shown that efficient local enforcement personnel do better work under State health department guidance. This may be due to the resultant moral support, to the aid given in especially difficult problems, or to the fact that it is natural to do better work when one knows his work will be checked.

IMPROVEMENT IN RETAIL RAW MILK

The improvement effected on the average in the retail raw milk of the Standard Ordinance cities, from the time of the first survey to the time of the last survey, is shown graphically in Figure 1. The various bars represent the percentages of the retail raw milk of the cities as a group which complied with the respective items of sanitation specified in the Standard Ordinance for grade A raw milk.

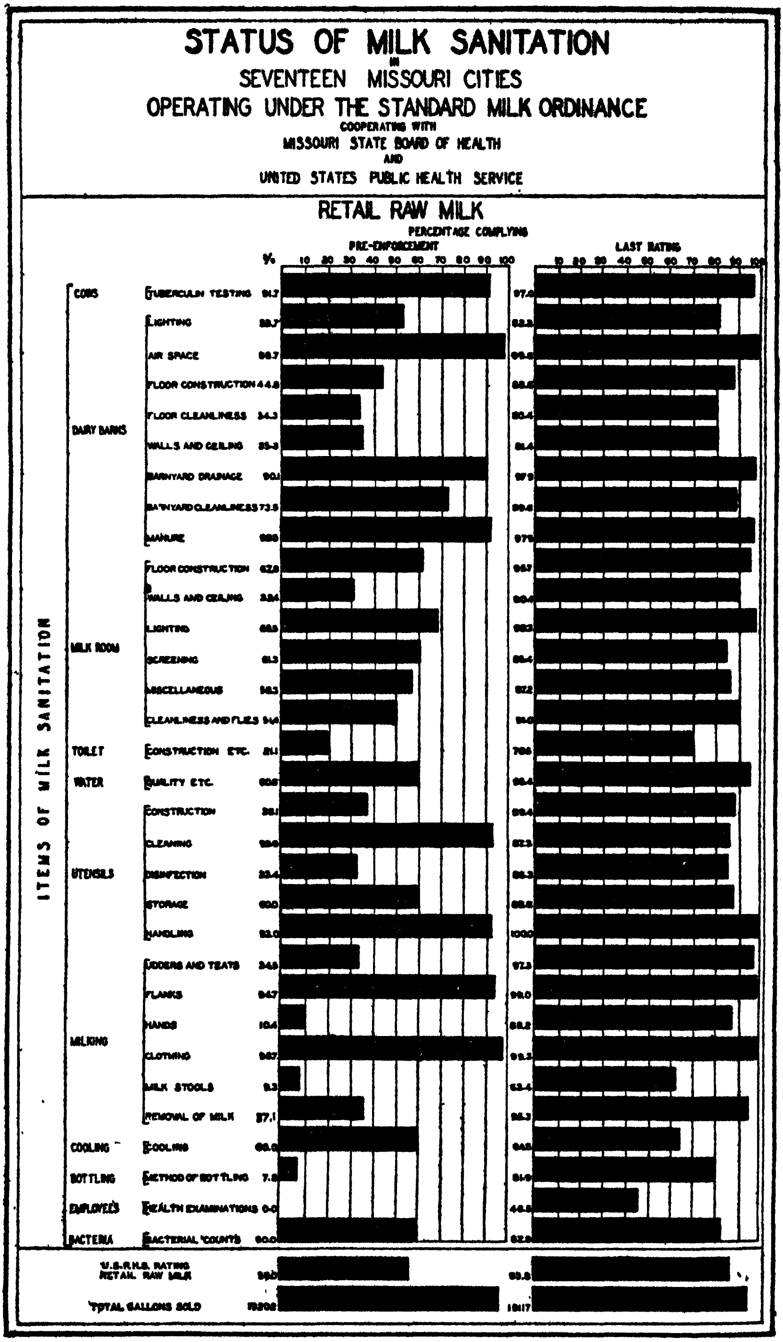

STATUS OF MILK SANITATION
IN
SEVENTEEN MISSOURI CITIES
OPERATING UNDER THE STANDARD MILK ORDINANCE
COOPERATING WITH
MISSOURI STATE BOARD OF HEALTH
AND
UNITED STATES PUBLIC HEALTH SERVICE
RETAIL RAW MILK
PERCENTAGE COMPLYING
PRE-ENFORCEMENT
LAST RATING
%
10 20 30 40 50 60 70 80 90 100
ITEMS OF MILK SANITATION
COWS
TUBERCULIN TESTING
DAIRY BARNS
LIGHTING
AIR SPACE
FLOOR CONSTRUCTION 44.8
FLOOR CLEANLINESS 34.3
WALLS AND CEILING
BARNYARD DRAINAGE
BARNYARD CLEANLINESS 73.5
MANURE
MILK ROOM
FLOOR CONSTRUCTION
WALLS AND CEILING
LIGHTING
SCREENING
MISCELLANEOUS
CLEANLINESS AND FLIES
TOILET
CONSTRUCTION ETC.
WATER
QUALITY ETC.
UTENSILS
CONSTRUCTION
CLEANING
DISINFECTION
STORAGE
HANDLING
MILKING
UDDERS AND TEATS
FLANKS
HANDS 10.4
CLOTHING
MILK STOOLS 9.3
REMOVAL OF MILK 37.1
COOLING
COOLING
BOTTLING
METHOD OF BOTTLING 7.8
EMPLOYEES
HEALTH EXAMINATIONS 0.0
BACTERIA
BACTERIAL COUNTS
U.S.P.H.S. RATING
RETAIL RAW MILK
TOTAL GALLONS SOLD

FIGURE 1

It will be noted that there are two horizontal sets of bars. The left-hand set gives the percentages for 13 of the cities for which preenforcement surveys were available, and the right-hand set gives the percentages for the 17 cities which were surveyed late in 1929 or early in 1930. Two of the 19 Standard Ordinance cities are omitted from this chart because neither of them had begun enforcement work at the time of the last survey.

It will be observed that there was quite a general improvement in the individual percentages of compliance. For example, the percentage of the retail raw milk which came from barns with properly constructed floors increased from 44.6 per cent to 88.6 per cent between the two sets of surveys. The screening of milk rooms increased from 61.3 per cent to 85.4 per cent compliance. The disinfection of milk utensils and containers improved from 33.4 per cent to 86.8 per cent compliance.

At the bottom of the chart are shown the weighted average percentages of compliance for the two sets of surveys. It will be noted that the retail raw milk of these cities as a group improved from an average of 56 per cent at the time when the work was begun, to an average rating of 85.8 per cent at the time of the last survey.

All of the preenforcement surveys, with the exception of one city surveyed by the State inspector, were made by representatives of the United States Public Health Service.

The United States Public Health Service preenforcement and last retail raw milk ratings for the individual cities are shown in Table 3. It will be noted that marked improvement has been secured in all cities which have had as much as six months' work under the Standard Milk Ordinance.

TABLE 3.—*United States Public Health Service rating for retail raw milk*

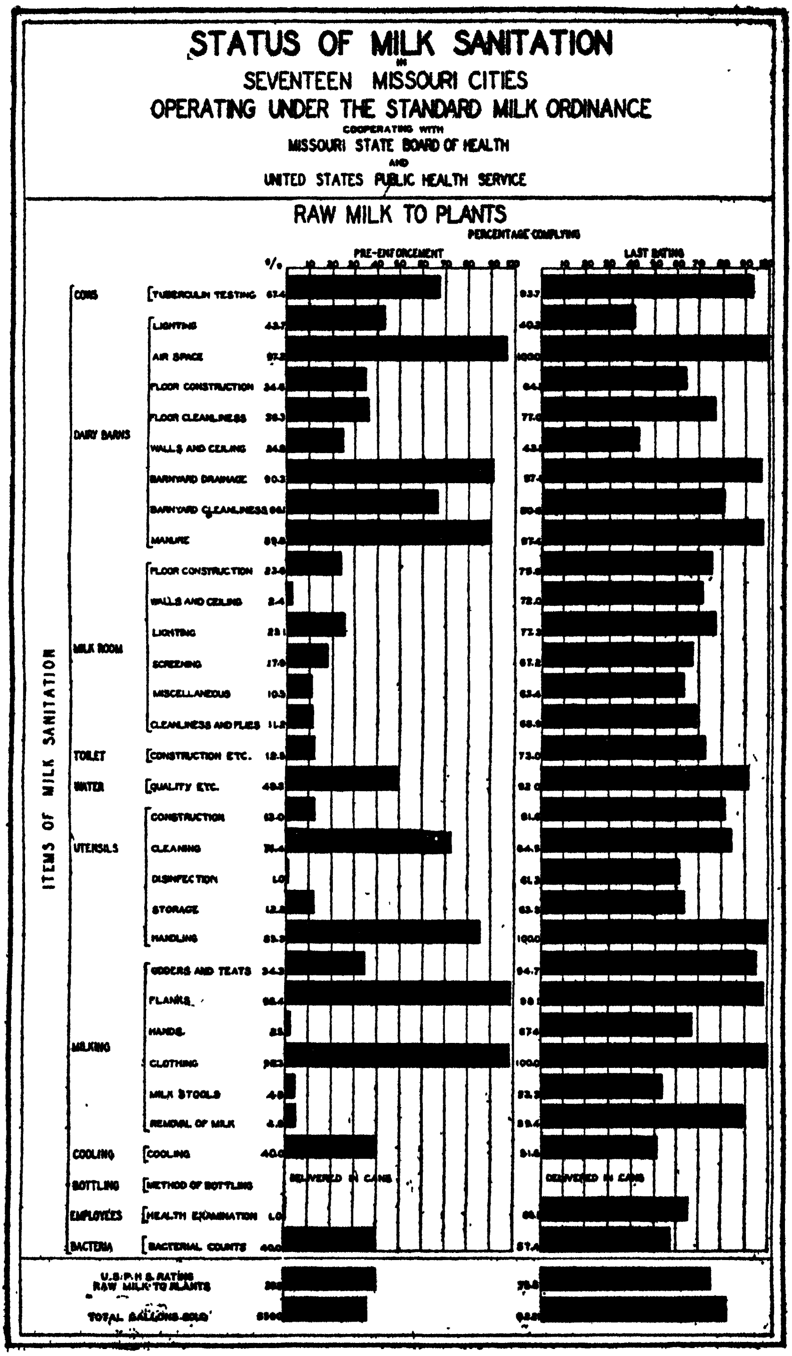
City	Preenforcement rating	Last rating	Percentage improvement	City	Preenforcement rating	Last rating	Percentage improvement
Ash Grove	38	[1] 81	113	Monett	59	[1] 78	32
Brookfield	29	[1] 78	169	Neosho	57	60	5
Cape Girardeau	56	[1] 78	39	Republic	36	36	--------
Carrollton	44	[1] 90	105	St Joseph	61	[1] 85	39
Carthage	--------	[1] 92	--------	Sedalia	------	[1] 96	--------
Hamilton	41	66	61	Springfield	63	[1] 90	43
Hannibal	53	[1] 95	79	Trenton	64	72	13
Independence	--------	[1] 88	--------				
Joplin	--------	[1] 93	--------				
Marshall	49	49	--------	Weighted average rating	56	86	54

[1] Cities in which as much as 6 months' time had elapsed between the passage of the ordinance and the time at which the last rating was made.

IMPROVEMENT IN RAW MILK TO PLANTS

Figure 2 shows the improvement in raw milk delivered to pasteurization plants.

The improvement in this fraction of the milk supplies of the 17 cities is even more marked than in the case of the retail raw milk


STATUS OF MILK SANITATION
IN
SEVENTEEN MISSOURI CITIES
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WALLS AND CEILING
LIGHTING
SCREENING
MISCELLANEOUS
CLEANLINESS AND FLIES
TOILET
CONSTRUCTION ETC.
WATER
QUALITY ETC.
UTENSILS
CONSTRUCTION
CLEANING
DISINFECTION
STORAGE
HANDLING
MILKING
UDDERS AND TEATS
FLANKS
HANDS
CLOTHING
MILK STOOLS
REMOVAL OF MILK
COOLING
COOLING
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METHOD OF BOTTLING
DELIVERED IN CANS
EMPLOYEES
HEALTH EXAMINATION
BACTERIA
BACTERIAL COUNTS
U.S.P.H.S. RATING RAW MILK TO PLANTS
TOTAL GALLONS SOLD

FIGURE 2

supplies. This is no doubt due to the fact that while a number of the larger cities had supervised their retail raw milk supplies prior to the passage of the Standard Milk Ordinance, not a single city had practiced routine inspections of the dairies supplying the pasteurization plants. This is reflected in the low average preenforcement rating of 39.9 per cent as compared with the last rating of 75.8 per cent.

The United States Public Health Service ratings for raw milk to pasteurization plants have been computed for the individual cities and are included in Table 4.

TABLE 4.—*United States Public Health Service ratings for raw milk to pasteurization plants*

City	Preenforcement rating	Last rating	Percentage improvement	City	Preenforcement rating	Last rating	Percentage improvement
Brookfield		[1] 80		St. Joseph	49	[1] 70	43
Cape Girardeau	29	[1] 41	41	Sedalia		[1] 72	
Hamilton	45			Springfield	35	[1] 79	126
Hannibal	44	[1] 87	98	Trenton	44	44	
Independence		[1] 68					
Joplin		[1] 84		Weighted average rating	40	76	90
Neosho	44	66	50				

[1] Cities in which as much as 6 months' time had elapsed between the passage of the ordinance and the time at which the last rating was made.

IMPROVEMENT IN PASTEURIZATION PLANT SANITATION

Figure 3 shows the improvement in pasteurization plants in those of the 17 cities selling pasteurized milk. The number of cities in which pasteurization plants were in operation has increased from 10 to 11. The number of pasteurization plants in these cities has increased from 13 to 18.

The low percentages of compliance shown for two of the six items relating to the pasteurization process are in large part due to existent old equipment which is difficult to fit with flush-type outlet valves and other modern improvements, or which is poorly insulated and therefore unsatisfactorily operated.

Considerable improvement is also needed in the item of health examinations.

Table 5 shows the United States Public Health Service ratings of the pasteurization plants in each of the cities in which a pasteurization plant is operated. The weighted average preenforcement rating for the group was 52, while the weighted average of the last rating is 83. This represents an improvement of 60 per cent.

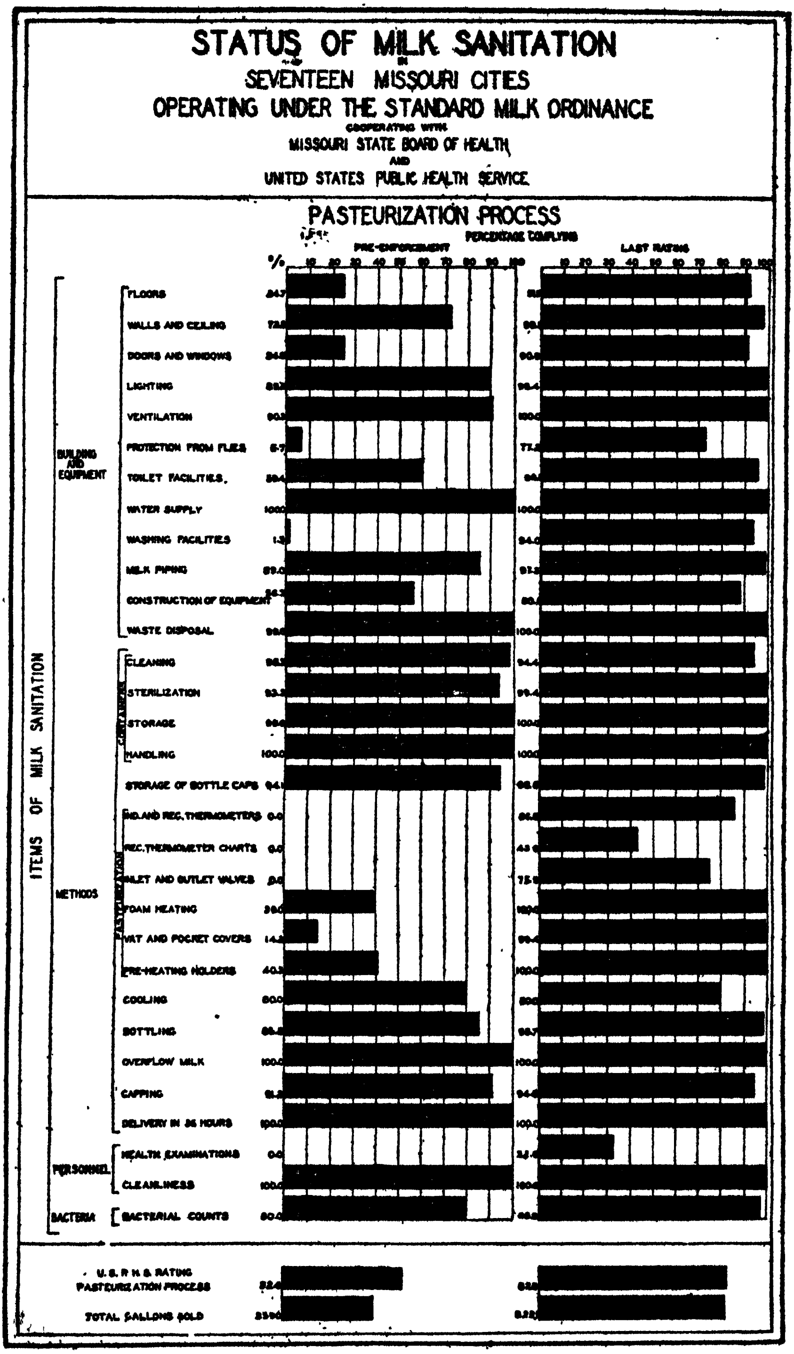
STATUS OF MILK SANITATION
IN
SEVENTEEN MISSOURI CITIES
OPERATING UNDER THE STANDARD MILK ORDINANCE
COOPERATING WITH
MISSOURI STATE BOARD OF HEALTH
AND
UNITED STATES PUBLIC HEALTH SERVICE
PASTEURIZATION PROCESS
PERCENTAGE COMPLYING
PRE-ENFORCEMENT
LAST RATING
ITEMS OF MILK SANITATION
BUILDING AND EQUIPMENT
FLOORS
WALLS AND CEILING
DOORS AND WINDOWS
LIGHTING
VENTILATION
PROTECTION FROM FLIES
TOILET FACILITIES
WATER SUPPLY
WASHING FACILITIES
MILK PIPING
CONSTRUCTION OF EQUIPMENT
WASTE DISPOSAL
METHODS
CONTAINERS
CLEANING
STERILIZATION
STORAGE
HANDLING
STORAGE OF BOTTLE CAPS
PASTEURIZATION
IND. AND REC. THERMOMETERS
REC. THERMOMETER CHARTS
INLET AND OUTLET VALVES
FOAM HEATING
VAT AND POCKET COVERS
PRE-HEATING HOLDERS
COOLING
BOTTLING
OVERFLOW MILK
CAPPING
DELIVERY IN 36 HOURS
PERSONNEL
HEALTH EXAMINATIONS
CLEANLINESS
BACTERIA
BACTERIAL COUNTS
U.S.P.H.S. RATING PASTEURIZATION PROCESS
TOTAL GALLONS SOLD

FIGURE 3

TABLE 5.—*United States Public Health Service ratings of pasteurization plants*

City	Preenforcement rating	Last rating	Percentage improvement	City	Preenforcement rating	Last rating	Percentage improvement
Brookfield		[1] 85		St. Joseph	51	[1] 81	59
Cape Girardeau	57	[1] 89	56	Sedalia		[1] 67	
Hamilton	40			Springfield	55	[1] 84	53
Hannibal	51	[1] 96	88	Trenton	50	45	−10
Independence		[1] 69					
Joplin		[1] 82		Weighted average rating	52	83	60
Neosho	49	45	−8				

[1] Cities in which as much as 6 months' time had elapsed between the passage of the ordinance and the time at which the last rating was made.

PERCENTAGE OF MILK PASTEURIZED

Table 6 shows the percentage of milk pasteurized in each of the cities at the first and last surveys:

TABLE 6.—*Percentage of milk pasteurized*

City	Per cent at first rating	Per cent at last rating	City	Per cent at first rating	Per cent at last rating
Ash Grove	0	0	Monett	0	0
Brookfield	0	22	Neosho	12	17
Cape Girardeau	45	46	Republic	0	0
Carrollton	0	0	St. Joseph	17	24
Carthage	1	0	Sedalia	0	11
Hamilton	16	0	Springfield	24	55
Hannibal	35	55	Trenton	29	21
Independence	0	9			
Joplin	14	40	Group	17	30
Marshall	0	0			

It will be noted that there has been an increase in the percentage of milk pasteurized for the group as a whole. In two of the cities more than 50 per cent of the total milk supply is now pasteurized, while in two others this part of the total supply is 40 per cent or over.

CONSUMPTION OF MARKET MILK

Improvement in quality of milk is only one of the two main objectives of the Standard Milk Ordinance program. The other, also of great public-health importance, is to increase the consumption of milk. The first ratings available for 17 of the 19 Standard Milk Ordinance cities (no accurate sales figures being available for Chillicothe and Moberly) show total sales of 23,152 gallons daily. This includes the four older cities on which the first rating available was not a preenforcement rating. It is believed that the total sales would be somewhat lower if we had preenforcement figures for these cities. The last rating on these same 17 cities shows total daily sales of 27,338 gallons, or an increase of 18 per cent. The per capita consumption of milk for these 17 cities is 0.74 pint per day.

To secure an accurate comparison of the increase in milk sales, the ratings should be made during the same season of the year. The preenforcement ratings, however, were made during high production months, whereas practically all of the sales figures shown under "Last rating" were secured during the fall and winter months, which are months of low production. If these two figures could have been secured during the same seasons, it is believed that a more marked increase would be shown.

While total sales have increased only 18 per cent, the total number of gallons of pasteurized milk sold daily has increased from 3,950 to 8,221, or 108 per cent.

SUMMARY

The results of the operation of the Standard Milk Ordinance in Missouri at the close of 1930 may be summarized as follows:

1. There are 19 cities, having a population of 315,127, operating under the Standard Milk Ordinance.
2. The sanitary quality of the retail raw milk has improved 54 per cent.
3. The sanitary quality of the raw milk delivered to pasteurization plants has improved 90 per cent.
4. The improvement in pasteurization plants is 60 per cent.
5. There has been a material increase in the consumption of pasteurized milk. Two cities now have over 50 per cent of their supply pasteurized and two others between 40 and 50 per cent. Pasteurized milk sales have increased 108 per cent.
6. The consumption of market milk has increased 18 per cent.
7. The per capita consumption of milk in 17 cities is 0.74 pint per day.

COURT DECISION RELATING TO PUBLIC HEALTH

Acts of inspector of United States Bureau of Animal Industry held, under facts of case, not to have been done in performance of Federal duty.—(United States Circuit Court of Appeals, 6th Circuit; Whipp et al. *v.* United States, 47 F. (2d) 496; decided Mar. 6, 1931.) The statutes of Ohio provided for the tuberculin testing of cattle, and appellants, who were defendants in the trial court, sought by injunction proceedings in the State courts of Ohio to restrain the State veterinarian from the threatened compulsory testing of their cattle. A temporary injunction was issued. Pending the hearing of the cause and while such temporary injunction was in full force, the State officers, to avoid the effect of such injunction, procured an inspector of the Federal Bureau of Animal Industry to accompany them and demand, as if on behalf of the Federal Government, the right to make the tuberculin test. Because of the resistance to this demand, the proposed

tests were abandoned and those resisting were indicted upon a charge of conspiracy to violate section 62 of the Federal criminal code, which section provided that "whoever shall forcibly assault, resist, oppose, prevent, impede, or interfere with any officer or employee of the Bureau of Animal Industry of the Department of Agriculture in the execution of his duties" should be punished as therein provided. Various acts of Congress contained provisions looking to the prevention of the interstate spread of animal diseases and authorizing cooperation with the several States. Cooperation by Ohio with the Federal Animal Industry Bureau had been approved and authorized by the legislature of that State.

The defendants were convicted, and they appealed to the circuit court of appeals. The appellate court reversed the judgment of the trial court and remanded the cause for error in refusing to direct verdicts of not guilty, the view being taken that the acts of the Federal inspector were not done in the performance of a Federal duty. The appellate court, in closing its opinion, concisely stated its finding as follows:

Briefly stated, our conclusion is that investigation by the making of tests solely to determine the existence or nonexistence of communicable diseases in cattle which are not shown to have entered, or to be about to enter, the stream of interstate commerce, lies exclusively within the domain of the police power of the State, and the rendition of a service by a Federal officer, solely in aid of the administration of a State law authorizing such compulsory tests, is not the performance of a Federal duty; nor does such act take Federal color by necessary implication from any of the other duties imposed upon or authority lawfully granted to the Secretary of Agriculture. * * *

DEATHS DURING WEEK ENDED MAY 23, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended May 23, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce.)

	Week ended May 23, 1931	Corresponding week, 1930
Policies in force	75, 141, 735	75, 792, 860
Number of death claims	13, 527	14, 742
Death claims per 1,000 policies in force, annual rate	9. 4	10. 1

Deaths [1] from all causes in certain large cities of the United States during the week ended May 23, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended May 23, 1931				Corresponding week, 1930		Death rate [2] for the first 21 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (81 cities)	7,990	11.7	633	[4] 48	11.9	736	13.4	13.1
Akron	40	8.1	2	20	8.4	6	8.4	8.5
Albany [5]	39	15.7	2	40	14.7	2	15.1	16.6
Atlanta	87	16.3	8	82	12.1	8	16.2	16.7
White	46		4	63		3		
Colored	41	(6)	4	115	(6)	5	(6)	(6)
Baltimore [5]	233	14.9	20	68	12.2	13	16.5	15.5
White	174		12	52		7		
Colored	59	(6)	8	125	(6)	6	(6)	(6)
Birmingham	53	10.3	4	40	11.0	8	15.0	14.3
White	23		0	0		4		
Colored	30	(6)	4	97	(6)	4	(6)	(6)
Boston	225	14.9	25	71	15.2	27	16.1	16.2
Bridgeport	33	11.7	6	100	9.9	3	12.4	13.2
Buffalo	133	11.9	14	57	15.0	12	14.7	14.5
Cambridge	31	14.2	1	20	11.0	2	14.1	13.8
Camden	27	11.8	3	52	11.4	5	16.9	14.9
Canton	19	9.3	2	46	11.9	0	11.3	11.4
Chicago [5]	715	10.8	63	56	10.8	68	11.6	11.5
Cincinnati	112	12.8	5	30	11.6	8	17.3	16.9
Cleveland	167	9.6	14	41	11.4	17	12.3	12.4
Columbus	88	15.5	7	68	14.0	10	15.1	18.0
Dallas	59	11.3	6		9.3	7	12.4	12.2
White	47		6			4		
Colored	12	(6)	0		(6)	3	(6)	(6)
Dayton	56	14.1	2	28	9.0	3	13.0	10.4
Denver	74	13.2	6	58	16.8	6	15.3	15.4
Des Moines	26	9.4	3	53	12.8	2	11.9	12.6
Detroit	253	8.0	32	51	10.6	34	9.4	10.5
Duluth	19	9.7	1	25	10.8	4	11.5	11.4
El Paso	31	15.4	3		17.2	8	17.6	18.6
Erie	27	12.0	1	19	15.7	4	11.7	11.5
Fall River [5] [7]	33	14.9	4	91	11.3	3	13.4	14.0
Flint	25	7.9	6	77	11.2	6	8.1	10.2
Fort Worth	32	10.0	3		9.2	2	12.4	11.6
White	24		3			1		
Colored	8	(6)	0		(6)	1	(6)	(6)
Grand Rapids	26	7.9	2	30	13.3	7	9.6	11.5
Houston	54	9.1	5		13.9	11	11.6	12.8
White	36		5			8		
Colored	18	(6)	0		(6)	3	(6)	(6)
Indianapolis	98	13.8	5	41	17.6	6	14.9	15.7
White	82		5	47		3		
Colored	16	(6)	0	0	(6)	3	(6)	(6)
Jersey City	74	12.1	6	53	11.0	7	13.1	13.0
Kansas City, Kans.	35	14.8	5	103	8.5	3	14.5	12.2
White	28		4	98		2		
Colored	7	(6)	1	127	(6)	1	(6)	(6)
Kansas City, Mo.	102	13.0	9	68	11.4	7	14.8	14.0
Knoxville	28	13.4	1	21	12.7	1	14.0	15.2
White	25		1	24		1		
Colored	3	(6)	0	0	(6)	0	(6)	(6)
Long Beach	33	11.3	0	0	7.6	1	10.6	10.4
Los Angeles	261	10.3	15	44	11.9	18	11.5	11.7
Louisville	58	9.8	5	43	10.5	3	15.9	14.5
White	40		3	30		2		
Colored	18	(6)	2	133	(6)	1	(6)	(6)
Lowell [7]	19	9.8	3	76	10.4	4	13.7	14.8
Lynn	13	6.6	0	0	13.7	3	11.5	12.2
Memphis	87	17.5	7	74	16.4	4	17.7	18.2
White	39		3	50		0		
Colored	48	(6)	4	116	(6)	4	(6)	(6)
Miami	24	11.1	0	0	10.3	8	13.9	12.5
White	13		0	0		2		
Colored	11	(6)	0	0	(6)	6	(6)	(6)

See footnotes at end of table.

Deaths [1] *from all causes in certain large cities of the United States during the week ended May 23, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930*—Continued

City	Week ended May 23, 1931				Corresponding week, 1930		Death rate [2] for the first 21 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Milwaukee	107	9.5	9	39	9 4	9	10.3	10.7
Minneapolis	97	10.7	4	26	8 7	5	12.0	11.3
Nashville	49	16.4	1	15	11.2	4	17.7	16.8
White	33		0	0		3		
Colored	16	(6)	1	59	(6)	1	(6)	(6)
New Bedford [7]	38	17.6	7	186	12 5	3	13 8	12.0
New Haven	35	11.2	0	0	13.1	1	13.2	14.8
New Orleans	137	15.3	12	66	15.7	14	18.5	19.0
White	79		3	25		5		
Colored	58	(6)	9	147	(6)	9	(6)	(6)
New York	1,509	11.1	108	45	11.3	170	12.9	12.1
Bronx Borough	222	8.7	11	25	8.2	20	9.3	8.6
Brooklyn Borough	502	10 0	46	49	10.8	64	11.9	11.2
Manhattan Borough	583	16.7	39	66	16.9	70	19.7	18.1
Queens Borough	159	7.2	10	27	6.5	14	8.2	7.9
Richmond Borough	43	13 7	2	36	12 1	2	14.2	15.2
Newark, N. J	107	12.5	8	42	14 9	6	13.3	14.0
Oakland	59	10.5	4	51	12.4	5	11.5	11.7
Oklahoma City	58	15 4	5	69	8 3	5	12.4	10.2
Omaha	47	11.3	5	56	11.9	3	14.6	14.0
Paterson	32	12.0	5	86	11.3	2	15.3	13.8
Philadelphia	505	13.4	37	54	11 3	34	15.4	13.9
Pittsburgh	165	12.7	10	35	13.6	14	17.1	15.5
Portland, Oreg	73	12.4	3	36	10.5	0	12.6	13.2
Providence	75	15.3	8	74	14 2	7	14.8	15.2
Richmond	46	13.0	2	29	15.1	1	17.3	16.2
White	27		1	22		0		
Colored	19	(6)	1	43	(6)	1	(6)	(6)
Rochester	68	10.7	9	82	11.4	6	13.5	12.8
St. Louis	200	12.6	15	50	13.6	11	17.1	14.8
St. Paul	61	11.5	6	62	10.7	2	11.6	11.0
Salt Lake City [5]	34	12.4	3	45	10 7	4	13.2	13.8
San Antonio	87	18.9	24		15 0	13	16.0	18.2
San Diego	36	12.0	0	0	15 7	6	14.9	15.1
San Francisco	141	11.3	4	27	13.7	5	14.1	13.8
Schenectady	24	13.0	0	0	12.5	3	11.6	12.6
Seattle	66	9.3	2	19	10.2	2	12.6	11.7
Somerville	18	8.9	1	37	9.0	1	11.0	11.9
South Bend	19	9.2	0	0	9 9	3	9.0	9.7
Spokane	21	9.4	0	0	10.4	2	12.9	13.5
Springfield, Mass	39	13.3	3	46	11.4	4	13.9	13.9
Syracuse	41	10.0	4	47	13.2	6	12.7	13.0
Tacoma	19	9.2	1	26	12.2	4	14.1	13.3
Toledo	65	11.5	5	46	9.7	3	13.0	14.0
Trenton	42	17.7	2	35	13.1	1	19 2	17.7
Utica	21	10.7	0	0	14.8	3	15.9	17.2
Washington, D. C	157	16.6	10	55	14.1	11	17.6	16.2
White	96		3	25		5		
Colored	61	(6)	7	120	(6)	6	(6)	(6)
Waterbury	18	9.3	1	30	7.8	0	11.0	10.6
Wilmington, Del. [7]	36	17.6	3	65	11 3	3	16.2	15.6
Worcester	35	9.3	3	41	13.3	1	14.5	15.0
Yonkers	21	7.9	2	52	9.2	3	9.7	9.1
Youngstown	33	10.0	1	14	10 7	5	11.3	11.2

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 76 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended May 30, 1931, and May 31, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 30, 1931, and May 31, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 30, 1931	Week ended May 31, 1930	Week ended May 30, 1931	Week ended May 31, 1930	Week ended May 30, 1931	Week ended May 31, 1930	Week ended May 30, 1931	Week ended May 31, 1930
New England States:								
Maine	4		6	9	17	98	1	1
New Hampshire	1			2	85	18	0	0
Vermont	1	1			42	80	0	0
Massachusetts	37	57	6	1	463	1,134	0	9
Rhode Island	4	3			123	15	0	0
Connecticut	3	10	2	2	435	26	0	2
Middle Atlantic States:								
New York	110	104	[1] 9	[1] 17	2,714	1,927	7	6
New Jersey	29	68	2		763	846	3	2
Pennsylvania	46	105			3,708	1,327	13	13
East North Central States:								
Ohio	38	70	25	7	1,396	629	5	7
Indiana	21	10	21		760	140	3	3
Illinois	175	112	9	4	2,317	351	19	8
Michigan	41	43	2	4	66	913	5	26
Wisconsin	5	16	22	12	781	798	3	4
West North Central States:								
Minnesota	10	23		1	167	196	1	1
Iowa	4	6				167	0	2
Missouri [2]	29	30	3	1	212	56	5	4
North Dakota	6	6			31	16	3	0
South Dakota	11	7			33		0	0
Nebraska	4	12	3		1	224	2	1
Kansas	4	13	2	1	100	365	0	2
South Atlantic States:								
Delaware	2	3			91	2	0	0
Maryland [3]	8	24	11	7	828	69	3	4
District of Columbia	10	9			202	68	2	0
Virginia [4]							2	
West Virginia	8	7	32	2	160	103	0	2
North Carolina	6	20	2	4	683	55	4	3
South Carolina	17	4	280	216	115		5	0
Georgia	2	1	37	24	145	140	2	1
Florida	3	5	2	2	191	120	0	0
East South Central States:								
Kentucky					93		3	3
Tennessee	4	4	10	17	116	180	0	3
Alabama	8	7	17	33	159	71	1	2
Mississippi	8	11					0	1

[1] New York City only.
[2] Figures for 1931 are exclusive of Kansas City.
[3] Week ended Friday.
[4] Typhus fever; 1931, 2 cases; 1 case in Virginia and 1 case in Texas.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 30, 1931, and May 31, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended May 30, 1931	Week ended May 31, 1930	Week ended May 30, 1931	Week ended May 31, 1930	Week ended May 30, 1931	Week ended May 31, 1930	Week ended May 30, 1931	Week ended May 31, 1930
West South Central States:								
Arkansas		1	9	7	30	23	0	0
Louisiana	21	9	25	9	2	28	3	1
Oklahoma [5]	7	13	27	15	30	206	0	2
Texas [4]	16	17	20	12	72	217	0	1
Mountain States:								
Montana		1			6	10	2	0
Idaho					4	11	1	0
Wyoming		6	1		2	45	0	0
Colorado	6	9			137	686	0	1
New Mexico	5	7			58	65	0	1
Arizona	3	2	1	4	13	114	0	2
Utah [3]		1	1		2	264	2	4
Pacific States:								
Washington	1	6			281	602	1	3
Oregon	3	6	10	14	53	82	0	0
California	43	58	33	18	899	1,977	0	6

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended May 30, 1931	Week ended May 31, 1930	Week ended May 30, 1931	Week ended May 31, 1930	Week ended May 30, 1931	Week ended May 31, 1930	Week ended May 30, 1931	Week ended May 31, 1930
New England States:								
Maine	0	0	27	27	0	0	4	2
New Hampshire	0	0	1	5	0	0	0	0
Vermont	0	0	3	7	1	0	0	0
Massachusetts	1	0	240	205	0	0	3	7
Rhode Island	0	0	36	23	0	0	0	1
Connecticut	0	0	35	34	0	0	1	1
Middle Atlantic States:								
New York	4	2	585	296	9	3	21	8
New Jersey	0	0	231	121	0	0	2	2
Pennsylvania	0	0	679	350	0	1	7	9
East North Central States:								
Ohio	2	0	516	293	58	145	7	6
Indiana	0	0	131	56	98	8	1	1
Illinois	1	0	669	270	74	65	11	11
Michigan	0	1	449	171	11	33	1	0
Wisconsin	1	0	93	122	80	6	1	1
West North Central States:								
Minnesota	2	1	77	57	7	6	0	5
Iowa	0	0	38	36	69	71	1	0
Missouri [2]	1	0	139	96	32	38	3	4
North Dakota	0	1	17	15	0	3	1	1
South Dakota	0	0	9	10	9	19	1	0
Nebraska	0	0	18	29	46	51	1	0
Kansas	0	0	23	52	49	33	2	3
South Atlantic States:								
Delaware	0	0	12	8	0	0	2	0
Maryland [3]	0	1	65	51	0	0	9	6
District of Columbia	0	0	25	11	0	0	0	1
Virginia [4]		1						
West Virginia	0	0	23	23	3	0	1	9
North Carolina	1	2	30	16	4	16	5	5
South Carolina	0	3	5	4	0	5	19	51
Georgia	0	0	55	6	0	0	19	1
Florida	0	0	2	5	0	1	3	4
East South Central States:								
Kentucky	1	0	20	30	7	4	6	1
Tennessee	0	0	13	11	0	17	2	8
Alabama	0	1	23	4	2	4	13	9
Mississippi	3	1	9	5	34	5	10	11

[2] Figures for 1931 are exclusive of Kansas City.
[3] Week ended Friday.
[4] Typhus fever: 1931, 2 cases; 1 case in Virginia and 1 case in Texas
[5] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended May 30, 1931, and May 30, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended May 30, 1931	Week ended May 31, 1930	Week ended May 30, 1931	Week ended May 31, 1930	Week ended May 30, 1931	Week ended May 31, 1930	Week ended May 30, 1931	Week ended May 31, 1930
West South Central States:								
Arkansas	0	0	10	4	23	0	5	4
Louisiana	3	7	15	2	19	14	17	18
Oklahoma [5]	0	0	11	86	44	62	6	4
Texas [4]	0	2	28	26	27	35	6	3
Mountain States:								
Montana	0	0	14	15	2	2	1	2
Idaho	0	0	2	2	0	2	1	0
Wyoming	0	0	15	10	0	5	0	0
Colorado	0	0	28	13	0	8	1	5
New Mexico	0	0	3	13	1	3	1	5
Arizona	0	2	4	14	0	6	3	4
Utah [3]	0	0	3	1	0	1	0	0
Pacific States:								
Washington	0	1	20	17	16	29	3	0
Oregon	0	0	13	14	18	27	0	1
California	3	15	103	94	7	35	6	13

[3] Week ended Friday.
[4] Typhus fever: 1931, 2 cases; 1 case in Virginia and 1 case in Texas.
[5] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
April, 1931										
Arkansas	5	21	918	78	192	236	2	111	144	23
Kansas	6	43	36		223	1	1	251	466	10
Mississippi	11	25	2,843	2,093	372	1,446	3	80	308	29
South Dakota	4	34	31		476		2	129	104	1
Virginia	10	66	2,050	19	3,449	82	0	162	22	23

April, 1931

	Cases
Anthrax:	
Kansas	1
Botulism:	
Kansas	1
Chicken pox:	
Arkansas	223
Kansas	398
Mississippi	950
South Dakota	134
Virginia	711
Dengue:	
Mississippi	2
Dysentery:	
Mississippi (amebic)	26
Dysentery and diarrhea:	
Virginia	121
German measles:	
Kansas	11
Hookworm disease:	
Arkansas	5
Mississippi	158
Impetigo contagiosa:	
Kansas	1
Lethargic encephalitis:	
Kansas	2
Mumps:	
Arkansas	147
Kansas	605
Mississippi	457
South Dakota	14
Ophthalmia neonatorum:	
Arkansas	1
Kansas	1
Mississippi	6
South Dakota	1
Puerperal septicemia:	
Mississippi	25
Rabies in animals:	
Mississippi	12
Rabies in man:	
Mississippi	1
Septic sore throat:	
Kansas	1
South Dakota	1

	Cases
Tetanus:	
Kansas	1
Trachoma:	
Kansas	6
Mississippi	5
South Dakota	39
Tularæmia:	
Kansas	1
Virginia	1
Undulant fever:	
Arkansas	1
Undulant fever—Continued.	
Kansas	7
Virginia	1
Vincent's angina:	
Kansas	5
Whooping cough:	
Arkansas	106
Kansas	233
Mississippi	372
South Dakota	44
Virginia	344

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,385,000. The estimated population of the 89 cities reporting deaths is more than 31,840,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended May 23, 1931, and May 24, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	791	937	
96 cities	399	499	747
Measles:			
45 States	20, 080	17, 243	
96 cities	8, 803	7, 311	
Meningococcus meningitis:			
46 States	122	126	
96 cities	70	63	
Poliomyelitis:			
46 States	19	25	
Scarlet fever:			
46 States	4, 727	3, 219	
96 cities	2, 355	1, 295	1, 235
Smallpox:			
46 States	755	1, 087	
96 cities	100	126	62
Typhoid fever:			
46 States	170	220	
96 cities	41	45	37
Deaths reported			
Influenza and pneumonia:			
89 cities	617	641	
Smallpox:			
89 cities	0	0	

City reports for week ended May 23, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	9	0	0		0	2	8	0
New Hampshire:								
Concord	0	0	0		0	46	0	1
Manchester	0	0	0		0	0	0	2
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	2	0	0		0	0	0	0
Massachusetts:								
Boston	69	32	11	2	1	89	8	13
Fall River	1	2	0		0	17	2	3
Springfield	0	2	2		0	13	10	0
Worcester	22	3	3		0	10	13	2
Rhode Island:								
Pawtucket		1						
Providence	11	5	4		0	123	12	4
Connecticut:								
Bridgeport	0	4	0	1	1	6	2	4
Hartford	6	5	0		0	15	0	2
New Haven	32	1	0		0	172	16	1
MIDDLE ATLANTIC								
New York:								
Buffalo	22	9	2		0	346	49	17
New York	430	241	113	7	4	1,835	83	169
Rochester	13	5	0		0	98	16	3
Syracuse	17	3	1		0	28	1	0
New Jersey:								
Camden	3	6	1		0	2	1	1
Newark	151	14	4	3	0	44	6	11
Trenton	4	2	0		0	4	5	3
Pennsylvania:								
Philadelphia	92	55	9	11	5	818	40	47
Pittsburgh	45	16	9	2	3	121	81	19
Reading	6	1	1		0	11	18	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	6	5	1		0	92	20	9
Cleveland	202	21	6	11	1	316	393	17
Columbus	29	3	3	2	0	8	5	2
Toledo	57	3	2	1	0	19	39	4
Indiana:								
Fort Wayne	3	1	1		0	12	0	0
Indianapolis	30	3	0		1	374	43	8
South Bend	4	0	0		0	9	0	0
Terre Haute	0	0	0		0	8	0	2
Illinois:								
Chicago	162	82	68	3	3	989	71	50
Springfield	12	0	0		0	29	5	4
Michigan:								
Detroit	140	41	29	2	1	58	65	13
Flint	40	2	2		0	0	6	1
Grand Rapids	1	1	0		1	69	1	1
Wisconsin:								
Kenosha	0	0	0		0	0	110	0
Madison	31	1	6			2	69	
Milwaukee	98	10	1	2	2	434	436	5
Racine	8	1	0		0	3	16	0
Superior	6	0	0		0	0	0	0

City reports for week ended May 23, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST NORTH CENTRAL								
Minnesota:								
Duluth	23	0	0		0	0	2	1
Minneapolis	147	12	3		0	158	130	9
St. Paul	73	8	1		0	61	11	3
Iowa:								
Des Moines	0	1	0			0	0	
Sioux City	28	0	0			6	11	
Waterloo	0	1	0			1	0	
Missouri:								
Kansas City	26	3	8		0	316	6	6
St. Joseph	5	0	9		0	11	0	0
St. Louis	7	30	13			12	20	6
North Dakota:								
Fargo	0	0	0		0	3	16	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	6	0	0			6	0	
Nebraska:								
Omaha	33	2	2		0	0	23	6
Kansas:								
Topeka	6	1	2		1	0	33	1
Wichita	8	1	1		0	6	0	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	2	1	0		0	22	0	0
Maryland:								
Baltimore	71	20	7	2	0	719	54	24
Cumberland	0	0	0	1	0	2	0	0
Frederick		0						
District of Columbia:								
Washington	23	11	6	1	0	248	0	11
Virginia:								
Lynchburg	9	0	1		0	5	0	0
Norfolk	5	0	1		0	223	0	1
Richmond	0	1	2		0	238	0	1
Roanoke	1	0	0		0	11	1	1
West Virginia:								
Charleston	1	0	0		0	2	0	1
Wheeling	15	0	0		0	0	0	1
North Carolina:								
Raleigh	2	0	2		0	39	0	1
Wilmington	0	0	0		0	6	0	1
Winston-Salem	5	0	0	2	0	93	27	3
South Carolina:								
Charleston	0	0	0	17	1	0	0	3
Columbia	1	0	0		0	0	8	0
Greenville	1	0	0		0	0	0	0
Georgia:								
Atlanta	4	2	0	8	0	15	0	5
Brunswick	0	0	0		0	0	5	0
Savannah	6	0	0	6	1	9	5	0
Florida:								
Miami	1	2	0		0	85	0	2
Tampa	5	0	1		0	29	0	2
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0		0	7	0	0
Tennessee:								
Memphis	9	1	1		1	110	4	7
Nashville	1	1	0		0	92	0	4
Alabama:								
Birmingham	2	1	1	5	2	3	2	7
Mobile	0	0	0		0	0	0	1
Montgomery	1	0	0			0	0	

City reports for week ended May 23, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	6	0	0			0	0	
Little Rock	0	0	1		3	14	1	7
Louisiana:								
New Orleans	7	8	18	1	1	1	0	5
Shreveport	3	0	1		0	4	4	4
Oklahoma:								
Muskogee	17	1	0			0	2	
Texas:								
Dallas	34	3	2		0	8	17	2
Fort Worth	3	1	3		2	0	0	1
Galveston	0	0	1		0	0	0	2
Houston	0	3	1		0	16	2	3
San Antonio	6	1	0		4	37	1	5
MOUNTAIN								
Montana:								
Billings	11	0	0		0	6	0	0
Great Falls	6	1	0		0	0	0	1
Helena	0	0	2		0	0	0	0
Missoula	6	0	0		0	0	0	0
Idaho:								
Boise	1	0	0		0	0	2	0
Colorado:								
Denver	39	7	4		2	46	42	6
Pueblo	0	1	0		0	17	0	0
New Mexico:								
Albuquerque	8	0	1		0	6	0	0
Arizona:								
Phoenix	0	0	0		0	2	0	0
Utah:								
Salt Lake City	15	2	1		1	1	4	1
Nevada:								
Reno	0	0	0		0	1	0	0
PACIFIC								
Washington:								
Seattle	83	2	0			21	47	
Spokane	14	2	0			5	0	
Tacoma	5	1	1		0	1	5	2
Oregon:								
Portland	22	5	0		0	23	11	6
Salem	6	0	0		0	5	5	0
California:								
Los Angeles	47	29	30	19	0	116	36	11
Sacramento	3	2	0		0	34	3	3
San Francisco	14	13	6	1	0	56	5	7

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	3	8	0	0	0	1	0	0	0	4	25
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	12
Manchester	1	0	0	0	0	2	0	0	0	0	18
Vermont:											
Barre	0	3	0	0	0	1	0	0	0	3	9
Burlington	0	0	0	0	0	0	0	0	0	6	11
Massachusetts:											
Boston	70	110	0	0	0	10	2	1	0	28	225
Fall River	4	6	0	0	0	2	0	0	0	0	33
Springfield	7	18	0	0	0	0	0	0	0	9	41
Worcester	7	37	0	0	0	8	0	0	0	9	35

City reports for week ended May 23, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND—continued											
Rhode Island:											
Pawtucket	2	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Providence	11	25	0	0	0	0	0	0	0	6	75
Connecticut:											
Bridgeport	7	3	0	0	0	0	0	0	0	0	33
Hartford	4	6	0	0	0	1	0	0	0	1	37
New Haven	5	3	0	0	0	0	0	0	0	5	35
MIDDLE ATLANTIC											
New York:											
Buffalo	23	25	0	4	0	5	1	0	0	16	128
New York	268	544	0	0	0	110	8	7	0	177	1,509
Rochester	10	66	0	0	0	3	0	3	0	24	65
Syracuse	9	30	0	0	0	1	0	0	0	18	41
New Jersey:											
Camden	5	2	0	0	0	1	0	0	0	5	27
Newark	26	40	0	6	0	9	0	0	0	79	110
Trenton	3	11	0	0	0	2	0	0	0	2	42
Pennsylvania:											
Philadelphia	90	181	0	0	0	31	2	2	0	36	505
Pittsburgh	30	89	0	0	0	8	0	0	0	30	165
Reading	4	1	0	0	0	0	0	0	0	1	22
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	15	39	2	0	0	9	0	1	0	4	112
Cleveland	37	67	1	0	0	15	2	3	0	25	167
Columbus	8	9	1	1	0	3	0	1	0	1	88
Toledo	11	12	0	0	0	8	0	0	0	25	65
Indiana:											
Fort Wayne	3	6	2	0	0	0	0	0	0	1	23
Indianapolis	13	39	7	10	0	6	0	0	0	41	-------
South Bend	4	4	0	0	0	1	0	0	0	4	20
Terre Haute	2	3	0	0	0	0	0	0	0	4	13
Illinois:											
Chicago	111	297	2	6	0	52	3	2	0	92	715
Springfield	3	4	0	0	0	1	1	0	0	0	18
Michigan:											
Detroit	108	152	1	4	0	24	2	1	0	136	253
Flint	10	27	2	3	0	0	0	0	0	5	25
Grand Rapids	9	13	1	0	0	0	0	0	0	28	26
Wisconsin:											
Kenosha	2	0	0	0	0	0	0	0	0	0	2
Madison	1	0	0	0	-------	-------	0	0	-------	1	-------
Milwaukee	28	12	0	0	0	6	0	0	0	28	107
Racine	4	4	0	0	0	0	0	0	0	16	14
Superior	2	3	0	0	0	0	0	0	0	2	5
WEST NORTH CENTRAL											
Minnesota:											
Duluth	7	0	0	0	0	0	0	0	0	0	19
Minneapolis	30	12	1	1	0	2	0	0	0	19	97
St. Paul	20	5	0	1	0	1	0	1	0	17	65
Iowa:											
Des Moines	7	3	2	7	-------	-------	0	0	-------	0	28
Sioux City	2	11	0	0	-------	-------	0	0	-------	5	-------
Waterloo	2	0	1	0	-------	-------	0	0	-------	5	-------
Missouri:											
Kansas City	16	4	1	0	0	7	1	0	0	6	102
St. Joseph	3	2	0	0	0	3	1	0	0	0	32
St. Louis	29	135	2	4	0	10	0	4	0	34	200
North Dakota:											
Fargo	1	0	0	0	0	0	0	0	0	10	7
Grand Forks	1	0	0	0	-------	-------	0	0	-------	0	-------
South Dakota:											
Aberdeen	0	0	0	0	-------	-------	0	0	-------	0	-------
Nebraska:											
Omaha	3	8	3	6	0	4	0	0	0	2	47
Kansas:											
Topeka	3	0	0	2	0	0	0	0	0	0	11
Wichita	4	1	0	21	0	1	0	0	0	4	24

City reports for week ended May 23, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
SOUTH ATLANTIC											
Delaware:											
Wilmington	3	5	0	0	0	1	0	0	0	0	86
Maryland:											
Baltimore	34	42	0	0	0	20	1	1	0	45	233
Cumberland	0	2	0	0	0	1	0	1	0	0	13
Frederick	0										
District of Col.:											
Washington	21	13	1	0	0	10	0	2	0	8	157
Virginia:											
Lynchburg	0	0	0	0	0	1	1	0	0	0	8
Norfolk	1	2	0	0	0	2	0	0	0	8	
Richmond	3	9	0	0	0	3	0	0	0	2	39
Roanoke	0	3	0	0	0	1	0	1	0	2	9
West Virginia:											
Charleston	1	1	0	0	0	0	0	0	0	2	7
Wheeling	1	0	0	0	0	0	1	0	0	1	12
North Carolina:											
Raleigh	0	0	1	0	0	1	0	0	0	30	18
Wilmington	0	0	1	0	0	0	0	0	0	15	8
Winston-Salem	0	0	0	0	0	0	0	1	0	30	21
South Carolina:											
Charleston	0	0	0	0	0	1	0	0	0	0	19
Columbia	0	0	0	0	0	1	0	0	0	2	16
Greenville	0	0	0	0	0	0	0	0	0	0	
Georgia:											
Atlanta	4	46	2	3	0	8	0	0	0	3	87
Brunswick	0	0	0	0	0	0	0	0	0	0	1
Savannah	1	0	1	0	0	0	1	0	0	0	29
Florida:											
Miami	1	0	0	0	0	1	0	1	0	5	24
Tampa	0	1	0	0	0	3	1	0	0	1	15
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	0	0	0	0	0	0	0	0	0	10
Tennessee:											
Memphis	6	35	1	6	0	9	1	0	0	22	87
Nashville	1	11	1	0	0	2	0	1	0	5	49
Alabama:											
Birmingham	0	11	1	0	0	4	1	0	0	3	53
Mobile	0	1	0	1	0	0	0	1	0	0	25
Montgomery	0	0	0	0			0	1		0	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0			0	0		5	
Little Rock	0	1	0	0	0	3	1	0	0	0	15
Louisiana:											
New Orleans	8	10	1	10	0	14	2	1	0	2	137
Shreveport	0	0	1	0	0	3	0	0	0	4	37
Oklahoma:											
Muskogee	1	0	2	0			0	1		0	
Texas:											
Dallas	2	9	2	0	0	3	0	0	0	20	59
Fort Worth	2	7	2	7	0	2	0	0	0	0	32
Galveston	0	1	0	0	0	2	0	1	0	0	16
Houston	2	4	1	3	0	8	1	0	0	0	54
San Antonio	0	0	1	1	0	3	1	0	0	0	87
MOUNTAIN											
Montana:											
Billings	0	4	0	0	0	0	0	0	0	9	12
Great Falls	1	0	0	0	0	0	0	0	0	2	11
Helena	0	0	0	0	0	0	0	0	0	0	6
Missoula	1	0	1	0	0	0	0	0	0	0	3
Idaho:											
Boise	0	2	1	0	0	0	0	0	0	0	

City reports for week ended May 23, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
MOUNTAIN—con.											
Colorado:											
Denver	12	20	0	1	0	6	0	0	0	37	74
Pueblo	1	1	0	0	0	1	0	0	0	4	7
New Mexico:											
Albuquerque	2	0	0	0	0	2	0	0	0	0	7
Arizona:											
Phoenix	1	0	0	0	0	1	0	1	0	0	--------
Utah:											
Salt Lake City	2	4	0	0	0	1	0	0	0	13	34
Nevada:											
Reno	0	0	1	0	0	0	0	0	0	0	2
PACIFIC											
Washington:											
Seattle	7	15	2	0	--------	--------	0	2	--------	99	--------
Spokane	4	2	6	2	--------	--------	0	0	--------	6	--------
Tacoma	3	0	3	0	0	1	0	0	0	6	19
Oregon:											
Portland	2	2	8	10	0	3	0	0	0	3	73
Salem	0	0	1	0	0	0	1	0	0	0	--------
California:											
Los Angeles	29	23	5	4	0	20	1	1	0	44	261
Sacramento	2	1	0	0	0	4	0	1	1	0	29
San Francisco	20	4	1	0	0	15	1	0	0	16	149

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	1	1	0	0	0	0	0	0	0
Massachusetts:									
Boston	1	0	0	0	0	0	0	0	0
Springfield	1	1	0	0	0	0	0	0	0
Worcester	0	0	0	0	0	0	0	1	0
Connecticut:									
Hartford	0	1	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	1	0	0	0	0	0	0	0
New York	8	2	2	3	0	0	1	2	0
Rochester	2	0	0	0	0	0	0	0	0
New Jersey:									
Camden	1	1	0	0	0	0	0	0	0
Newark	1	1	0	0	0	0	0	1	0
Pennsylvania:									
Philadelphia	1	2	0	0	0	0	0	0	0
Pittsburgh	5	0	3	1	0	0	0	0	0
Reading	1	1	0	0	0	0	0	0	0
EAST NORTH CENTRAL									
Indiana:									
Indianapolis	3	2	0	0	0	0	0	0	0
Illinois:									
Chicago	16	8	1	0	0	0	0	1	1
Springfield	1	0	0	0	0	0	0	0	0
Michigan:									
Detroit	4	3	1	0	0	0	0	0	0
Flint	1	0	0	0	0	0	0	0	0
Wisconsin:									
Racine	0	0	1	0	0	0	0	0	0

City reports for week ended May 23, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	0	0	0	0	0	0	0	2	1
Missouri:									
Knasas City	0	1	0	0	0	0	0	0	0
St. Joseph	0	1	0	0	0	0	0	0	0
St. Louis	3	2	0	0	0	0	0	0	0
North Dakota:									
Fargo	0	2	0	0	0	0	0	0	0
Nebraska:									
Omaha	3	0	0	0	0	0	0	0	0
SOUTH ATLANTIC									
Delaware:									
Wilmington	1	0	0	0	0	0	0	0	0
Maryland:									
Baltimore	2	1	2	1	0	0	0	0	0
District of Columbia:									
Washington	3	2	0	0	0	0	0	0	0
Virginia:									
Norfolk	1	0	0	0	0	1	0	0	0
Roanoke	0	1	0	0	0	0	0	0	0
West Virginia:									
Wheeling	0	1	0	0	0	0	0	0	0
North Carolina:									
Raleigh	1	0	0	0	1	1	0	0	0
Winston-Salem	0	1	0	0	2	2	0	0	0
South Carolina:									
Charleston	0	0	0	0	6	0	0	0	0
Columbia	1	2	0	0	0	2	0	0	0
Georgia:									
Atlanta	2	0	0	0	0	0	0	0	0
Savannah	0	0	0	0	4	1	0	0	0
Florida:									
Miami	0	0	0	0	1	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	1	1	0	0	1	0	0	0	0
Nashville	0	1	0	0	0	0	0	0	0
Alabama:									
Birmingham	4	2	0	0	1	1	0	0	0
Montgomery	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	2	0	0	0
Louisiana:									
New Orleans	2	2	0	0	2	2	0	0	0
Texas:									
Dallas	0	0	0	0	2	0	0	0	0
Fort Worth [1]	0	0	0	0	0	1	0	0	0
Houston	0	0	0	0	0	1	0	0	0
PACIFIC									
California:									
Los Angeles	0	0	0	0	1	0	0	0	0

[1] Typhus fever, 1 case at Forth Worth, Tex.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended May 23, 1931, compared with those for a like period ended May 24, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, April 19 to May 23, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930[1]

DIPHTHERIA CASE RATES

	Week ended—									
	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930
98 cities	53	91	63	83	[2] 67	77	63	74	[3] 62	79
New England	58	85	36	82	[4] 35	65	38	106	[4] 50	68
Middle Atlantic	46	99	61	72	61	85	58	74	63	76
East North Central	58	113	84	130	82	103	72	91	67	115
West North Central	67	68	57	68	71	45	71	74	75	72
South Atlantic	51	64	69	50	63	62	55	54	[5] 38	54
East South Central	23	48	6	0	41	6	17	36	12	24
West South Central	71	101	68	94	108	73	81	66	81	52
Mountain	26	88	26	44	[6] 28	70	61	35	61	53
Pacific	63	49	53	61	61	49	74	43	72	59

MEASLES CASE RATES

	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930
98 cities	1,342	1,356	1,250	1,293	[2] 1,308	1,411	1,403	1,255	[3] 1,375	1,159
New England	1,286	1,710	964	1,942	[4] 1,103	2,303	1,166	1,843	[4] 1,230	1,877
Middle Atlantic	1,418	1,192	1,411	1,284	1,433	1,295	1,486	1,337	1,478	1,091
East North Central	1,075	999	897	1,005	1,102	927	1,313	814	1,458	685
West North Central	830	1,352	777	1,003	1,016	1,269	1,396	831	1,098	794
South Atlantic	4,049	1,306	3,871	1,188	3,553	1,298	3,365	1,228	[5] 2,844	957
East South Central	1,600	407	1,426	185	1,263	442	1,234	359	1,234	568
West South Central	139	592	156	731	152	711	166	735	271	547
Mountain	661	8,802	661	5,912	[6] 576	9,128	531	6,652	618	7,119
Pacific	517	2,067	505	1,773	501	1,992	554	1,670	456	2,180

SCARLET FEVER CASE RATES

	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930
98 cities	405	262	368	296	[2] 390	258	389	226	[3] 368	206
New England	575	348	582	268	[4] 631	310	666	261	[4] 546	314
Middle Atlantic	488	239	409	285	448	266	439	222	442	204
East North Central	432	360	402	394	439	318	454	308	412	227
West North Central	469	248	480	384	440	238	383	262	340	306
South Atlantic	304	248	273	294	276	242	243	172	[5] 242	164
East South Central	396	126	407	132	250	138	337	24	390	102
West South Central	98	59	132	115	105	94	108	73	85	49
Mountain	191	229	191	361	[6] 177	370	157	229	270	300
Pacific	86	176	94	109	108	130	123	128	88	97

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931, and 1930, respectively.
[2] Pawtucket, R. I., Billings, Mont., and Boise, Idaho, not included.
[3] Pawtucket, R. I., and Frederick, Md., not included.
[4] Pawtucket, R. I., not included.
[5] Frederick, Md., not included.
[6] Billings, Mont., and Boise, Idaho, nor included.

Summary of weekly reports from cities, April 19 to May 23, 1931—Annual rates per 100,000 population, compared with rates for the corresponding peroid of 1930—Continued

SMALLPOX CASE RATES

	Week ended—									
	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930
98 cities	21	30	27	27	[3] 15	24	17	22	[3] 16	20
New England	0	0	0	0	[4] 0	2	0	0	[4] 0	0
Middle Atlantic	1	0	1	1	3	0	1	0	4	0
East North Central	20	18	10	21	6	22	23	16	15	10
West North Central	71	145	125	132	78	101	75	126	67	110
South Atlantic	6	0	6	0	8	0	6	4	[5] 6	2
East South Central	35	42	58	36	41	6	12	72	41	30
West South Central	98	38	101	31	64	38	41	21	47	10
Mountain	17	97	0	150	[6] 0	79	17	62	9	70
Pacific	41	109	51	73	12	83	25	47	12	71

TYPHOID FEVER CASE RATES

	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930
98 cities	3	6	6	6	[3] 5	6	5	8	[3] 6	7
New England	2	5	7	2	[4] 5	0	5	10	[4] 2	19
Middle Atlantic	4	5	7.	3	5	4	5	7	5	4
East North Central	2	6	4	6	2	2	2	2	5	5
West North Central	4	4	4	4	2	8	6	8	10	8
South Atlantic	2	12	14	6	8	16	12	14	[5] 12	12
East South Central	6	0	12	24	6	18	17	42	17	24
West South Central	0	24	0	21	7	3	7	35	7	10
Mountain	9	0	0	53	[6] 0	18	0	0	0	0
Pacific	4	4	6	6	8	20	0	2	8	6

INFLUENZA DEATH RATES

	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930
91 cities	13	12	11	9	[3] 12	9	8	8	[3] 7	6
New England	7	12	7	5	[4] 5	10	2	0	[4] 5	5
Middle Atlantic	12	9	12	9	11	10	7	7	5	7
East North Central	6	14	5	7	11	9	5	4	5	5
West North Central	18	9	12	9	6	3	9	3	3	0
South Atlantic	10	12	20	16	22	6	16	20	[5] 4	6
East South Central	44	39	19	19	50	13	50	39	19	19
West South Central	55	25	38	21	14	28	7	4	28	7
Mountain	17	18	26	0	[6] 28	0	9	9	26	9
Pacific	5	0	2	5	7	7	7	12	0	5

PNEUMONIA DEATH RATES

	Apr. 25, 1931	Apr. 26, 1930	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930
91 cities	137	140	121	135	[3] 117	133	102	102	[3] 94	101
New England	132	189	154	164	[4] 135	131	113	111	[4] 75	109
Middle Atlantic	165	160	141	163	144	176	121	124	121	130
East North Central	98	108	77	107	87	92	74	67	68	79
West North Central	230	81	180	114	121	126	103	108	97	84
South Atlantic	168	210	180	204	130	132	126	170	[5] 107	110
East South Central	126	227	120	123	120	142	126	84	120	78
West South Central	145	132	152	110	114	164	114	78	97	82
Mountain	104	150	61	62	[6] 102	123	78	79	70	123
Pacific	46	50	46	42	70	52	55	47	55	35

[3] Pawtucket, R. I., Billings, Mont., and Boise, Idaho, not included.
[3] Pawtucket, R. I., and Frederick, Md., not included.
[4] Pawtucket, R. I., not included.
[5] Frederick, Md., not included.
[6] Billings, Mont., and Boise, Idaho, not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended May 16, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended May 16, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia	1	6			
New Brunswick					4
Quebec					9
Ontario	1	2		5	14
Manitoba			1		1
Saskatchewan				15	2
Alberta [1]					
British Columbia [1]					
Total	2	8	1	20	30

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended May 23, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended May 23, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	2	Ophthalmia neonatorum	4
Chicken pox	101	Poliomyelitis	1
Diphtheria	27	Puerperal fever	1
Erysipelas	3	Scarlet fever	60
German measles	5	Tuberculosis	79
Measles	367	Typhoid fever	5
Mumps	19	Whooping cough	13

CUBA

Provinces—Communicable diseases—Four weeks ended May 9, 1931.—During the four weeks ended May 9, 1931, cases of certain communicable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer					2		2
Chicken pox	3	62	10	23	1	6	105
Diphtheria		19	3	6	1		29
Malaria		4			1	53	58
Measles	1	87		14			102
Paratyphoid fever		1			1		2
Scarlet fever	1	18				1	20
Typhoid fever	1	27	5	33	1	21	88

JAPAN

Nagasaki—Typhoid fever.—According to a report dated May 28, 1931, typhoid fever was epidemic in the port of Nagasaki, Japan.

MEXICO

Tampico—Communicable diseases—April, 1931.—During the month of April, 1931, certain communicable diseases were reported in Tampico, Mexico, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	6		Measles	10	2
Diphtheria		2	Tuberculosis	53	33
Enteritis (various)		32	Typhoid fever		5
Influenza	70	5	Whooping cough	17	4
Malaria	193	3			

PANAMA CANAL ZONE

Communicable diseases—April, 1931.—During the month of April, 1931, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	6		Pneumonia		24
Diphtheria	6		Scarlet fever	2	
Dysentery (amebic)	3		Tuberculosis		25
Leprosy		1	Typhoid fever	3	1
Malaria	102	3	Typhus fever	1	
Measles	37		Whooping cough	9	
Mumps	1				

PORTO RICO

San Juan—Communicable diseases—Five weeks ended May 16, 1931.—During the five weeks ended May 16, 1931, cases of certain communicable diseases were reported in San Juan, Porto Rico, as follows:

Disease	Cases	Disease	Cases
Diphtheria	2	Pellagra	2
Influenza	7	Tetanus (infantile)	1
Malaria	16	Whooping cough	73
Measles	1		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931			April, 1931				May, 1931				
						14	21	28	4	11	18	25	2	9	16	23	30
Ceylon: Colombo	C					1											
China: Canton	C									1						1	
India	C	11,112	10,687	15,334	11,544	2,471	857	2,551	2,989	3,161							
	D	5,933	5,689	8,123	6,131	1,252	473	1,314	1,511	1,571							
Bombay	C	13		21						2							
	D	7		9						1							
Calcutta	C	22	28	121	170	80	102	129	125	95	82	71			89		
	D	16	20	86	112	49	68	69	70	55	51	44			44		
Karikal	C		1		9	2	1	7	2	10	8			10			
	D				8	2	1	7	2	5	8			5			
Madras	C		201	99	72	4	5	7	4	3	1	4	18	18	22		
	D		67	47	29	5	3	2		5	1	3	5	6	8		
Negapatam	D			3	3												
Rangoon	C		1														
	D		1	1													
Tuticorin	C	5	1	1	1												
India (French):																	
Chandernagor	C	1	2	1	5	2	2	2	1			1		3			
	D		3	1	5	2	3	1						3			
Pondicherry	C	4	31	19	100	29	25	26	20	5	3			3	8	3	
	D	4	21	11	34	6	5	4	3	1	3						
India (Portuguese)	C		1														
Indo-China (see also table below).																	
Pnompenh	C	2		4	9					1	1						
	D	2		2	5		1					1		2			
Saigon and Cholon	C	3	9	6	4	1		1	3	2	3	7	15	25	23	34	
	D	1	4	3	4	2	1	1	1		3	6	13	20	18	25	
Persia: Rafsandjan	C													31			
	D													12			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931: 14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9	16	23	30
Philippine Islands:[1]																	
Iloilo	C	1	1	2													
	D	3	1	2													
Provinces—																	
Capiz	C			59	186	29	11	4	4		3	8	18	11	3		3
	D			47	146	24	10	4	3		3	8	13	11	3		1
Iloilo	C	45	28	145	95	2	5										
	D	27	22	110	65	2	2										
Masbate	C					21											
	D					9											
Negros, Occidental	C	163	120	90	4												
	D	123	97	56	4												
Negros, Oriental	C			1													
	D			1													
Pampanga	C													1			
Samar	C	8	17														
	D	8	9														
Siam	C	6	2	3	1		4	4	2	1				11			
	D	6	2	1			1	1						3			
Ayudhaya District	C								1								
Bangkok	C	4	2	3	2		1	1	1	1		1		1	1	1	
	D	4	2	1	1		1	1				1				1	
Bismulok Province	C						4	4									
	D						1	1									

Place		October, 1930	November, 1930	December, 1930: 1–10	11–20	21–31	January, 1931: 1–10	11–20	21–31	February, 1931: 1–10	11–20	21–28	March, 1931: 1–10	11–20	21–31
Indo-China (French) (see also table above):															
Cambodia[2]	C	22	26	28			7	19	36	71	35	19	14		65
Cochin-China[2]	C	28	13	8			7	4	13	5	5	19	39		33

[1] Figures for cholera in the Philippine Islands are subject to correction.

[2] Reports incomplete.

PLAGUE

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931			April, 1931				May, 1931				
						14	21	28	4	11	18	25	2	9	16	23	30
Algeria:																	
Algiers	C	2	1	2	1				1								
	D								1								
Bone	C			1													
Constantine, vicinity of	C		50	1	1												
	D			1													
Philippeville	C		1														
	D		1														
Argentina:																	
Cordoba Province	C			1	2												
Entre Rios Province—Diamante	C				2												
Jujuy Province—Palpala	C			1	1												
Santa Fe	C				2												
Belgian Congo	C	1					2										
	D	1					2										
British East Africa (see also table below):																	
Tanganyika	C	3	2		22		8					3			5		
	D	3	2		4		1					10			2		
Uganda	C	111	67	25	15	4	7	4	4	8	3						
	D	112	67	24	15	4	7	4	4	8	3						
Ceylon: Colombo	C	9	9	8	11	1	3	3	1	1	3			1			
	D	8	9	6	13	1	3	2	1	1	2			1			
Plague-infected rats		2		2	3		3	1			1						
China: Amoy	C													1			
	D													1			
Dutch East Indies:																	
Batavia and West Java	C	208	239	180	141	18	31	23	12	19							
	D	206	238	163	128	17	28	23	12	18							
East Java and Madura	C			4	1	1		1	2								
	D			4	1	1		1	2								
Java and Madura	D	557	615	427	376	65	81	68	63	58	73	70	42				
Egypt:																	
Alexandria	C	4	3	1	2	1											
	D	1															
Plague-infected rats		3	1	1	1												
Assiout	C	9	7	26	41	6	10	1	1	5	16	8	3	4	5	8	1
	D	1	1	6	11		4	1	1		11	4	2	2	4	1	
Aswan	C	3															

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec 13, 1930	Dec. 14 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 1, 1931	Week ended— March, 1931: 14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9	16	23	30
Egypt—Continued.																	
Beni-Suef	C			1								10	2	3		2	
	D			1								3		1		2	
Cairo	C								1								
Deirout	C			21	16								3	7	1		2
	D			4	4								1	2	2		
Gharbieh	C			1													
	D			1													
Girga	C		7	1			14	37	35	31	9	4		1	1	5	
	D		2	1			2	5	17	13	3	5	1	1	1		
Kena	C							5				3				1	
	D							2				1				1	
Manfalut	C		23	30	15	3	5	9									
	D		5	6	5		2	1									
Minieh	C	1		2			2	1			1			5		1	
	D			1			1	1						2		1	
India	C	3,259	3,740	5,335	5,457	2,674	2,271	2,462	1,732	2,503							
	D	1,856	2,226	3,422	3,661	1,887	1,624	2,009	1,526	1,960							
Bassein	C		2	4	1								1				
	D		1	3	1								1				
Bombay	C			1	1	1	1	1	1	4	4	1	2	5			
	D			1	1		2	1		4	4		3	4	1		
Plague-infected rats		32	38	34	32	17	14	21	18	34	43	30	20	26	30		
Calcutta	C									1	1						
	D									1	1						
Madras Presidency	C	148	220	312	74	9	12	7		3							
	D	78	154	182	46	4	12	5		2							
Rangoon	C		2	2				1		1				1			
	D		1	1				1		1				1			
Plague-infected rats		4	2	4	8				1	1	3			1			
Indo-China (see also table below): Pnompenh	C	6	1	7	1												
	D	6	1	7	4	2	1	1	2	2	1	1					
Iraq: Baghdad	C	4		5	3	1	3	3	1		5	10	8	7	10	4	2
	D	2		4	2		3	1	1		2	5	1	3	4	2	
Madagascar (see also table below): Tamatave	C	4	2	9													
	D	3															

Morocco	C		19	13													
	D		8	4													
Nigeria: Lagos	C	9	5	1						2	2	1					
	D	9	5	1						2	2	1					
Plague-infected rats		5	5							3	3						
Peru (see table below).																	
Senegal (see table below).																	
Siam	C			4	18	2	2			1							
	D			2	14	1	1			1							
Bangkok	C	1	3	8	6	29											
	D	1	3	8	5	6											
Nagara Rajsima	C	11	17	9	7			1									
	D	9	10	10	6												
Syria: Beirut	C		1	1	1												
Tripolitania	C	13		8	1	1											
	D	1		3													
Tunisia: Tunis	C	P	13	1	14		5		5	5	7		4			1	
	D				7				4	4	2		2				
Union of Socialist Soviet Republics:																	
Gouranduz	D			28													
Transcaucasia—Karabakh	C			6													
Union of South Africa:																	
Cape Province	C	P							2	1							
Orange Free State	C		2	P	1	2		4	P	1	1						
	D		2		1			1		1	1						
On vessel: S. S. Marionga de Thermiotis at Avonmouth	C		1														

Place		Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931
British East Africa (see also table above):							
Kenya	C	62	50	69	21	7	12
Indo-China (see also table above)	C	5	1			4	2
Madagascar (see also table above):							
Ambositra Province	C	44	95	100	92		
	D	44	87	96	88		
Antisirabe Province	C	18	27	66	84		
	D	18	26	57	79		
Miarinarivo Province	C	12	18	28	31		
	D	12	18	26	29		
Moramanga Province	C	19	13	7	7		
	D	19	11	5	7		
Tananarive Province	C	170	178	92	145		
	D	164	172	89	139		

Place		Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931
Peru	C	34	41	29	12		
	D	14	13	8	6		
Senegal							
Baol [1]	D	4					
Dakar [1]	C						2
	D						1
Louga [1]	C	10				14	1
	D	3				6	
Rufisque [1]	C				2		
Thies [1]	C	27	2				
	D	23	1				
Tivaouane [1]	C	21	2				4
	D	25	1				

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931: 14	21	28	March, 1931: 7	14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9	16	23
Algeria:																			
Algiers	C		1	1		1					2			2					
Bone	C			1															
Constantine	C									1							1		
Oran	C	3																	
Arabia. Aden	C			1	1														
Belgian Congo	C		79	50															
Belgium	C				1														
Brazil: Porto Alegre (alastrim)	C	36		3	1	1	2	3	7	12	16	14	20	19					
	D							1				1							
British East Africa (see also table below) · Tanganyika	C	385	84	70	35	42	13	1	6	2									
	D	36	4	5		12	1		1	2									
British South Africa: Southern Rhodesia	C	18	18	13															
	D	3																	
Canada:																			
Alberta	C	1	19	7	1														
British Columbia	C	1	3	2	1	2	5												
Manitoba	C			1			1												
Winnipeg	C		1				1												
Nova Scotia	C			1							1								
Ontario	C	23	17	49	10	4	7	8	2	3	3	1			6	7	17	5	
Kingston	C		6	1		1									2	3			
North Bay	C		2		1														
Ottawa	C	12	2	3		1													
Sault Ste. Marie	C		1	30			2						3	1				1	
Toronto	C	4							1		1			4			1		
Quebec	C	2		2															
Saskatchewan	C	18		38	17	18	18	10	40	10	8		5	16	3	22	7	15	18
Regina	C					1					2				2		2		
Canary Islands: Las Palmas	C										1								
China:																			
Amoy	C										1					2			
	D										1					1			
Canton	C				2			1	1	2	2	2	1	2	1				
Chungking	C	P	2																

Foochow	C	P	P	P		P		P		P		P	P						
Hong Kong	C		1	1	2	5		2			1	1		1	2				
	D				1	1	1				2				1		1		
Manchuria—																			
Harbin	C			1			4		1		1								
Kwantung—Dairen	C	4	1								2				1	1			
	D	1																	
Nanking	C	P	P	P	P	P	P	P		P	P	P	P	P	P	P			
Shanghai—																			
Foreigners only	C	8	14	12	4	7	2	3	3	1	1	1	2	1	2	2	1	4	1
Including natives	D	4	11	13	5	2	4	3	5	2	2	1	2	7	4	5	1		3
Swatow	D	3	5	7		3	3	7	3	6	9	8	2						
Tientsin	C	2		1															
Chosen (see table below).																			
Colombia: Cali	D	1																	
Dutch East Indies: Java—Batavia and West Java	C	6	4	29		2			1										
	D	2	2	2	1														
France (see table below).																			
Great Britain:																			
England and Wales	C	508	665	958	221	50	247	227	171	219	226	179	177	163	212	192	186		
Bradford	C	1	1	4		1				1		1	1		1	4	1		
Leeds	C		2									1		1	1		1		
London	C	184	161	149	23	16	23	36	26	54	32	35	51	39	84	53	66		
London and Great Towns	C	433	560	693	150	186	189	158	117	154	166	117	142	126	162	128	139		
	D	1				1									1				
Sheffield	C			3		16	6	10	2	1	6	1	4	2	1				
Stoke-on-Trent	C			1				1											
Greece (see table below).																			
Honduras:																			
Amapala	C							1											
Ocotopeque and Gracias districts	C							P											
Puerto Castilla	C		4	11	3														
Tegucigalpa	C														1				
Tela	C												1						
India	C	3,627	5,623	9,623	2,996	2,766	3,003	3,457	3,440	1,695	3,395	3,261	3,980						
	D	874	1,381	2,245	665	620	706	669	655	303	655	638	807						
Bombay	C	1	2	7		1	3	2	4	1	4	1	2	2	1	3	3		6
	D	1	2	1		1	1	1		1	2	1	1			4	1	1	1
Calcutta	C	18	59	143	35	51	83	82	53	69	75	86	101	60	61	65	24	30	
	D	11	40	100	26	41	66	55	36	54	50	63	78	42	50	54	18	25	
Cochin	C	22	15	29	19		16	24	15	17	14		10	11	12	6	3		
	D	4	1		1		1	1											
Karachi	C	3		3			4			3		1		5		1			
	D	1		2							2								
Madras	C	20	4	16	4	1	3	1	6	3	9	4	12	4	1	2	1	3	
	D	3				1				2	1		2	1	1	1		1	
Moulmein	C			2															
Negapatam	C	6											1	1		1			
Rangoon	C	1			2		1	1	1	1	1		2	2	1	6	7	5	
	D								1							1	2	1	
Vizagapatam	C			1			8		1		1		2	2	4	2			
	D						2				1		1		1				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931 14	21	28	March, 1931 7	14	21	28	April, 1931 4	11	18	25	May, 1931 2	9	16	23
India (French):																			
Chandernagor	C		5	9	2		6	6	3	3	6	2	3	1			3		
	D		3	1			1					2	3	1			3		
Karikal	C		3	5	2		16	1			3			1	1	2	1		
	D		2	4	2		16							1		2	1		
Pondicherry Province	C	19	34	45	1	1	10	7	7		4	3	3			3	1	2	7
	D	17	32	45	1	1	10	7	7		4	3	3	3		3	1	2	7
India (Portuguese)	C		4	5	2	3	6	3		3	5			19	2				
	D				2		1			1	2			4	2				
Indo-China (see also table below):																			
Pnompenh	C	1	2	1					1										1
	D	1		1															
Saigon and Cholon	C	2		6		2	2		4	1	1	2	1						
	D	2		4			1		3	1	2	2	1					1	
Iraq:																			
Baghdad	C						3	6							1	1			
Mosul Liwa	C	16	1	3		5													
	D	2				1													
Ivory Coast (see table below).																			
Japan:																			
Kobe	C						1	1											
Taiwan	C			1															
Mexico (see also table below):																			
Jalisco (State)—Guadalajara	D	3		1							1					1	1		1
Mexico City and surrounding territory	C	6	10		7	5		11	13	13	7		17	9	11	6	4		
	D	6	6	1	1	3	2	2	5	5	6	6	4	6	4		4		
Torreon	C													1				1	
	D													2					
Vera Cruz	C				1		1	1		1	1			1		1	1		
Morocco (see table below):																			
Nicaragua: Porto Cabezas	C		2																
Nigeria: Lagos	C										2								
Panama Canal Zone	C			2															
Poland	C	3	25			1													
Portugal: Lisbon	C	37	72	103		12	19	9	16	15	17	4	8	18	11	19	19		
Siam	C		1	4	1	1													

Somaliland, British: Boales	C	1																	
	D		1																
Spain	C	P	P	P	P	P	P	P	P	P	P								
Straits Settlements	C	17	6	7			2				2	1	1		1				
	D	7	3	1			1				1		1	1					
Sudan (Anglo-Egyptian)	C	50	64	11	1	1	44	51	3	1	4					3		3	
	D	5	6	7			6	4		1	1								
Sudan (French) (see table below).																			
Syria (see table below).																			
Tunisia: Tunis	C		17	8							4								
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P				P			P	P	P	P					
Orange Free State	C	P		P			P	P			P	P	P	P					
Transvaal	C	P	P	P	P	P	P	P	P		P								
Upper Volta	C	6	4			8	10				3			3			1		
	D		2								1								
On vessel:																			
S. S. Clan Mactoggart at Suez	C				2														
S. S. Muncaster Castle at Manila from Hong Kong	C		1																
S. S. Matheran at Suez from Calcutta	C			1															
S. S. Clan Buchanan at Suez	C						2												
S. S. Rotterdam at Naples from Venice	C										1								
S. S. Clan McTavish at Manila from Chittagong	C													1					
S. S. Benvenue at Sydney from Shanghai	C			1															
S. S. Clan MacBrayne at Cochin	C				1														
S. S. Chilka at Rangoon	C					1													
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C															1			
S. S. Talodi at Soakim	C																	1	

Place		Oct., 1930	Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931
British East Africa (see also table above):							
Kenya	C		653				
Chosen	C	22			1		11
	D	6			1		3
France	C				4	16	
Greece	C			4		4	
Mexico (see also table above)	D	893		1		3	
Morocco	C	4	20	25		4	6
Turkey	C	74	65	116		37	1
	D	1	1	9		6	

Place		October, 1930	November, 1930	December, 1930			January, 1931			February, 1931			March, 1931		
				1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-28	1-10	11-20	21-31
Indo-China (see also table above)	C	258	86	38	9	14	47	48	46	95	46	27	125		139
Ivory Coast	C	4	2	9											
Sudan (French)	C	17		43		96							4		P
	D	2		16		4									
Syria: Beirut	C							1							

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931			March, 1931				April, 1931				May, 1931			
					14	21	28	7	14	21	28	4	11	18	25	2	9	16	23
Algeria:																			
Algiers	C	2			1	1					3				2	1	3		
Constantine Department	C	2	6	31			4			1		2	2		6	1	8	3	
Oran	C	5		3				1							1				
Australia, western	C		3									1							
Bulgaria	C	11	1	13		2		3				9		26	4				
	D											2		3					
Chile: Valparaiso	D									1									
China:																			
Canton	C			2					1										
Manchuria—Harbin	C	1		3			5				3								
Shanghai	C			2															
Tientsin	C	1											1	1					
Chosen (see table below).																			
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C	2												1					
	D														1				
Beheira Province	C		1										3	1					
	D		1										2						
Cairo	C	1	1	1															
Port Said	C			1															
Eritrea: Asmara	C								1										
Great Britain: Scotland	C			1															
Glasgow	C			2															
	D			1															
Greece (see table below).																			
Guatemala.[1]																			
Iraq: Baghdad	C				2	1	1	1	1								2		
	D				1												1		
Irish Free State:																			
Kerry County—Dingle	C																1		
Mayo County—Belmullet	C													1					

Place																			
Latvia (see table below).																			
Lithuania (see table below).																			
Mexico (see also table below):																			
Durango	D			1															
Mexico City, including municipalities in Federal District	C	14	12	39	13	13	9		46	66	73	31	67	34	38	31	16		
	D	7	10	34	4	7	5		20	13	31	20	18	7	17	14	9		
San Luis Potosi	D	2			2	2		1	1	1	2	1	1	2					1
Morocco	C	1	8	8	7	8	5	8	2	2	3			1		12		13	
	D			2		1										1		2	
Palestine	C	7	4	2	3				2	1	1	1	1	2		2	2	1	1
Panama Canal Zone—Balboa	C																	1	
Paraguay: Asuncion	D			4															
Poland	C	42	63	106	49	41	43	56	62	58	85	82	93	176	140	129	92	81	
	D	7	3	8	3	3	4	9	4		7	4	8	7	6	7	6	4	
Portugal: Oporto	C	6		1															
Rumania	C	34	113	193	49	53	12	38	55	53	52	54	70						
	D	3	5	16	5	11	3	5	4	5	3	4	8						
Spain	C	1																	
	D	1																	
Syria	C																	3	
Tunisia:																			
Sbeitla, vicinity of	C											20	2			10			
	D											7							
Sfax	C										2								
Tunis	C	28		16			6	12	5	2	7		2			10		9	8
Turkey (see table below).																			
Union of South Africa.																			
Cape Province	C	P	P	P	P	P	P	P	1		P	P	P	P					
Municipality of East London	C	1	3	3							P	P							
Natal	C		P	P	P	P				1	P	P	P	P					
Orange Free State	C		P	P	P		P	P	P				P	P					
Transvaal	C	P	P	P	P	P	P	P	P		P	P	P	P					
Yugoslavia (see table below).																			

Place		Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	Place		Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931
Chosen: Seoul	C	1	1	1		3		Lithuania	C	5	6	26	3	22	32
Czechoslovakia	C	16	24	60	26				D	1	3	3	1	2	3
Greece	C	4	10	10	17	8		Mexico (see also table above)	D	47	47				
	D			2	2	1		Turkey	C	3	2		18		
Latvia	C				12			Yugoslavia	C	2	1	20	12	10	43
									D		1	2		1	5

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reports an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb 7, 1931	Week ended— February, 1931: 14	21	28	March, 1931: 7	14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9	16	23
Brazil:																			
Bahia State	C								1	1									
Ceara State	C			1					2							2		1	
	D			1												2		1	
Minas Geraes State	C									2			1		2	2	1		1
	D									1					1	1	1		
Rio de Janeiro State	C							1	1	1								1	1
	D							1	1	1									
Cambucy	C			3	1														
	D			3	1														
Friburgo (imported)	C			1															
Padua	C			2	1														
	D			2	1														
British Cameroon: Mamfe	C																	3	
	D																	1	

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REPORT OF COMMITTEE ON MILK

CONFERENCE OF STATE AND PROVINCIAL HEALTH AUTHORITIES OF NORTH AMERICA[1]

EARLE G. BROWN, M. D., *Secretary Kansas State Board of Health, Chairman*

(1) Inasmuch as the report of the Committee on Milk Production and Control, of the White House Conference on Child Health and Protection, is the result of an extended study and investigation of all phases of milk in its relation to the public health, including (*a*) its relation to communicable disease, (*b*) its public health supervision, (*c*) its nutritional aspect, and (*d*) its economic aspect, the committee is of the opinion that that report contains our present knowledge in relation to milk and milk control, and fairly represents scientific opinion on the subject.

Therefore the committee recommends the acceptance and approval of the entire report by the Conference of State and Provincial Health Authorities.

(2) Occasionally it becomes necessary for various reasons for and individual family to reduce expenditures. When such occasions arise the committee would warn against a reduction in the consumption of milk. The importance of milk in the national diet, particularly in the nutrition of children, must be constantly kept in mind; and we strongly advocate that milk consumption should be increased rather than reduced, even when it becomes necessary to readjust the family budget.

(3) The attention of the committee has been directed to two recently published papers, the apparent purpose of which is to attempt to prove that raw milk possesses a significant dietary superiority over pasteurized milk.

The first of these articles appeared in The Jersey Bulletin and Dairy World for February 11, 1931. It was entitled, "Ohio Tests Prove Natural Milk is Best," and was by Ernest Scott, M. D., and Lowell A. Erf. According to an editorial which accompanied the article, the work was carried on under the auspices of the National Applied Dairy Science Foundation, which is supported financially by such organizations as the American Jersey Cattle Club.

The paper reports experiments upon the feeding of white rats on raw certified milk, on raw milk from cows fed upon special feed,

[1] Washington, D. C., April 27-30, 1931.

and on pasteurized milk. The following table is given as a summary of observations on the increase in the weight of the rats used in these experiments:

General summary

One hundred and forty-seven rats completing test; each experiment covered a period of five months, 1929–30

[Weight (average gain)]

	Number of animals	Initial	1 month	3 months	5 months
Control	28	40	152	187	210
Certified	18	42	115	153	185
Special raw	52	46	93	148	168
Special pasteurized	8	45	93	127	147
Commercial pasteurized	41	46	54	84	99
	147				

The following conclusions are drawn by the authors:

(1) These experiments tend to prove that the milk of cows fed upon a diet rich in minerals and vitamins is a more nutritious food than the usual commercial milk.

(2) Milk from properly fed cows that is subjected to heat loses its hematogenic and growth-promoting properties.

(3) Rats fed upon commercial pasteurized milk fortified by cod-liver oil and tomato juice failed to equal in growth and development rats fed upon the milk of cows given a diet high in mineral vitamins.

(4) The unpasteurized milk from cows fed upon the diet described in this report does not produce the anemia usually reported as occurring in the albino rat following an exclusive milk diet.

(5) The results of these experiments correspond closely with those obtained by Lewis and by Ladd, Evart, and Frank in their infant feeding experiments.

The committee desires to point out that in all but one of the four experiments which the authors report, the raw and pasteurized milk used for experimental purposes were not the same and were therefore not comparable. The raw milk was drawn from cows to whose regular feed had been added a "special complex mineral mixture, consisting of bone meal and other ingredients, and of dried fish meal consisting largely of fish liver and fish viscera." The pasteurized milk used was an entirely different milk, procured from a corner grocery store, was reported as having a slightly lower butter fat content than the raw milk, and was undoubtedly from cows which had not received the same special feed as above indicated. It would, therefore, be unscientific to draw any conclusions from these experiments with reference to the effect of pasteurization upon the nutritive value of milk. In order to draw valid conclusions it is necessary to use the same milk for both series of animals, making sure that the only difference between them is the factor of pasteurization. This was done in only one of the four experiments and the number of animals to which the pasteurized milk was fed in this case

was only eight, whereas the number of animals to which the corresponding raw milk was fed was 52. Such a sweeping conclusion as is contained in the title of this paper should not be drawn from experimental results upon only eight animals. In fact, the paper does not contain satisfactory evidence that the relatively slight difference between the average weights of the raw and pasteurized groups may not have been within the range of probable experimental error.

The second article appeared in The Lancet for March 21, 1931. It is by Mattick and Golding, of the National Institute for Research in Dairying, and is entitled, "Relative Value of Raw and Heated Milk in Nutrition."

The experiments reported in this paper were also upon rats. The rats were fed raw milk, milk which had been sterilized for 30 minutes at 210° to 212° F., milk which had been stored in a "cold cellar" for 24 hours and then sterilized for 30 minutes at 210° to 212° F., and milk which had been pasteurized for 30 minutes at 145° to 149° F. As a result of these experiments the authors formulated the following summary:

> A method is described by means of which it is demonstrated that raw milk with biscuit, made only from white flour and water, is capable of sustaining the growth and reproduction of rats. A fourth generation on this diet at the time of writing is as healthy and normal as the previous generations. Sterilized milk fed under similar conditions failed to sustain life and reproduction beyond the first generation, except on one occasion, when a second generation of very stunted animals was produced. Even the original rats (the first generation) failed in many instances to reach maturity.
>
> Preliminary experiments with pasteurized milk demonstrate results sufficiently marked to indicate that milk heated at a temperature of 145° to 149° F. for a half hour has undergone changes which have considerably reduced its dietetic value. The factors which are destroyed will form the subject of a future communication, but there are indications that the partial destruction of Vitamin B_1 must be included in the number.

The committee believes that the experimental results do not justify the conclusion that pasteurization is harmful, since the average weight of the six bucks fed pasteurized milk for four months was 235 grams, as compared with 256 grams for the six bucks fed raw milk, and since the average weight of the six does fed pasteurized milk for four months was 183 grams compared with 184 grams for the six does fed raw milk. The committee feels that these differences may not be justly termed significant.

The committee is advised, however, that in a number of States reprints are being prepared of such material as the above and distributed broadcast by the raw milk dealers in an effort to discredit pasteurized milk in the mind of the consumer.

It is highly important, therefore, that the public health officials be in position to furnish consumers with the results of other observations.

For this reason the committee is including in this report the following abstracts of other articles:

ABSTRACT OF REPORT OF THE GEORGE M. OYSTER, JR., BABY MILK PHILANTHROPY FOR THE FIRST EIGHTEEN MONTHS BEGINNING APRIL 24, 1911, AND ENDING OCTOBER 24, 1912, WITH OBSERVATIONS REGARDING THE RELATIVE NUTRITIVE VALUE OF PASTEURIZED AND RAW MILK FOR INFANT FEEDING.

One hundred and eleven babies were fed pasteurized milk exclusively and 208 babies were fed raw milk exclusively. The average net gain for all babies (both well and ill) receiving pasteurized milk was 0.4274 ounces per day. The average net gain for all babies (both well and ill) receiving raw milk was 0.4253 ounces per day.

Another group of 62 babies received both raw and pasteurized milk at different times. The average net gain made by these babies (both well and ill) while receiving pasteurized milk was 0.4457 ounces per day. The average net gain made by the same babies (both well and ill) while receiving the raw milk was 0.4440 ounces per day.

The results of either or of both observations above referred to would seem to indicate that no possible injury to the nutritive properties of milk for infant feeding results from modern, scientific pasteurization, and it must be concluded, certain possible risks can be eliminated through the careful pasteurization of milk that can not be so completely and safely eliminated in any other way.

ABSTRACT OF ARTICLE ENTITLED, "DEMONSTRATES FOOD VALUE TO BE EQUAL IN RAW MILK AND IN PASTEURIZED MILK," BY DR. J. M. BRANNON, NUTRITIONIST AND BACTERIOLOGIST, UNIVERSITY OF ILLINOIS. THE MILK DEALER, APRIL, 1930.

After two groups of rats were fed, one with raw milk and the other pasteurized milk (pasteurized under laboratory conditions) for several weeks, no difference was found between the two groups of rats. This work showed that so far as nutritional value is concerned there was no difference between the two types of milk.

The second experiment varied from the first in that commercial pasteurized milk was used rather than laboratory pasteurized milk. * * * The conclusion from both experiments is that raw milk and pasteurized milk are equal in nutritional value.

In experiment 3 * * * rats were divided into four lots and kept in separate cages; one lot was fed pasteurized milk only, the second lot was fed raw milk, the third lot was fed a mixed diet which was supposed to be complete in itself, plus raw milk, and the last lot was fed the same mixed diet plus pasteurized milk. The accumulated results of all three of these experiments indicate no preference for raw milk.

ABSTRACT OF REPORT TO THE LOCAL GOVERNMENT BOARD UPON THE AVAILABLE DATA IN REGARD TO THE VALUE OF BOILED MILK AS A FOOD FOR INFANTS AND YOUNG ANIMALS. JANET E. LANE-CLAYPON. M. D., DSc., LONDON. FROM NEW SERIES NO. 63. REPORT TO THE LOCAL GOVERNMENT BOARD ON PUBLIC HEALTH AND MEDICAL SUBJECTS, LONDON, ENGLAND.

After exhaustive analysis and review of the existing experimental evidence described in a 60-page report, the author comes to the following conclusion:

The balance of evidence, both experimental and clinical, points in the main to the same conclusion. Both lines of research show—

(1) That there is apparently no serious loss of nutritive value produced by feeding an animal upon boiled milk derived from an animal of the same species.

At the same time it must be pointed out that the public evidence on this point is scanty.

(2) That when an animal is fed upon the milk of another species, the milk from which has been found to be suitable for this purpose, such small differences as have been found in the nutritive value of raw and boiled milk have been in favor of boiled milk.

(3) That the milk of the same species has a considerably higher nutritive value for that species than the milk of any other species so far investigated.

ABSTRACT OF ANNOTATION IN "THE LANCET" FOR JANUARY 17, 1931, ON AN ARTICLE ENTITLED, "MILK CONSUMPTION AND THE GROWTH OF SCHOOL CHILDREN," BY G. LEIGHTON AND P. L. McKINLEY, EDINBURGH. H. M. STATIONERY OFFICE, 1930.

A test was conducted with 20,000 children attending schools in Lanarkshire. The heights and weights of all the children were measured by a special staff of doctors and nurses at the beginning of the feeding period and again at the conclusion of the experiment some four months later. The whole of the milk used was Grade "A" (tuberculin tested), one-half of it being given raw and the other half pasteurized. One-half of the children acted as controls, and the other half receiving three-fourths of a pint of either raw or pasteurized milk.

The results of the test support the conclusions reached by other workers—namely, that additional milk definitely accelerates the rate of growth as measured by increase both in weight and height. The differences between the milk groups and the control groups were small, as would be expected in a test lasting only four months. In most of the age groups the average increase in weight was 4 to 6 ounces more in the children receiving milk than in the controls, and the average increase in height was about one-tenth of an inch more in the milk groups. No significant difference was observed between the growth-promoting effect of raw and pasteurized milk.

The committee feels that the evidence contained in these articles is not entirely satisfactory and that there is need for further study of an authoritative type. It understands that the Public Health Service is contemplating the possible advisability of making a study to determine the present experience with reference to the feeding of infants with raw and pasteurized milk. It is understood that the proposed plan of work is to circularize the various State health departments with a request that arrangements be made whereby the public health nurses will make a survey of the present condition of infants of 2 years of age and under in their respective territories, securing information as to present weight, as to whether raw or pasteurized milk has been fed, as to supplementary feeding, and as to the frequency of illnesses.

The committee wishes to urge the Public Health Service to undertake such studies immediately, and to recommend to the Conference of State and Provincial Health Authorities that it support such studies by every means within its power. The committee believes that if it can be proved that the average American child which has been fed pasteurized milk shows about the same increase in weight and the same general state of health as the average American child which has been fed raw milk, this will be sufficient to convince the average American parent that the public health advantages of pas-

teurization may be utilized in infant feeding without dietary disadvantage. After all, what we are interested in, is the effect of milk upon human babies rather than the effect of milk upon the young of animals.

AN EPIDEMIOLOGICAL STUDY OF TYPHOID FEVER IN SIX OHIO RIVER CITIES[1]

By M. V. Veldee, *Surgeon, United States Public Health Service*

The sanitary regulation and control of a public water supply has for its prime object the elimination, in so far as possible, of all waterborne diseases, particularly typhoid fever. The results following the inauguration of such control in cities wherein the water supplies were previously of poor quality and the typhoid rates were high are readily demonstrated. However, as the sanitary control becomes more nearly perfect, bringing the bacteriological quality of the water nearer to the usually accepted standards of purity, it becomes increasingly difficult to demonstrate the relationship between the public supply and the remaining incidence of typhoid fever. In fact, under such circumstances it is usually impossible accurately to evaluate the responsibility of the drinking water in the occurrence of the remaining cases. It is a matter of great importance to pursue field studies along this line whenever possible. Particularly is this true in cities which are compelled to draw their public water supplies from sources to which are continually being added greater and greater quantities of dangerous pollution. The necessity of future alterations in, or improvements to, the methods of sanitary control will, in such cities, be largely governed by the typhoid fever trends.

Certain of the smaller cities which border on the Ohio River make an excellent field laboratory for studies of this nature. Their water supplies come from the Ohio River, which is at all times so dangerously polluted that its use in the raw state has in the past invariably resulted in a high incidence of typhoid fever. Even with the present methods of efficient artificial purification the danger is ever present, since operative lapses may sometimes occur. How extensive such lapses could be before they would result in a discoverable increase in the typhoid incidence is problematic. Such knowledge is essential to the proper safeguarding of the community's health. It was the purpose of the study here reported to investigate carefully each current case of typhoid fever occurring over a considerable period of time and to examine into its possible relationship to any recorded deterioration in the bacteriological quality of the public drinking water.

The cities studied include East Liverpool, Steubenville, Ironton, and Portsmouth, Ohio; Wheeling, W. Va., and Ashland, Ky. The

[1] From the Stream Pollution Laboratory of the United States Public Health Service, Cincinnati, Ohio.

public water supply history of each of these Ohio River cities is essentially the same. For years the public supply was drawn from the river and delivered direct to the consumer without any form of artificial purification. In more recent years sanitary improvements have been installed from time to time until, for the years covered in the present epidemiological study, each of the six cities studied used modern methods of artificial purification.

METHODS OF STUDY

Bacteriological data.—The filtration plants in the six cities studied are provided with well-equipped laboratories, in which daily bacteriological examinations are made of the water in the various stages of purification. Prior to 1922 the chemist in charge of each plant very largely designated the details of the bacteriological methods to be used, and, due to minor differences in procedure, the reports from the six plants did not necessarily have the same weight. In 1922, Sanitary Engineer H. W. Streeter,[2] of the United States Public Health Service, in connection with his studies of water purification, effected, through the respective State health officers, a cooperative arrangement with each supervising chemist which assured the availability of uniform bacteriological data. Under this arrangement each chemist agreed to modify his methods where necessary so as to bring them in agreement with those used in the Stream Pollution Laboratory at Cincinnati,[3] and at the end of each month the plant operator submitted to the Cincinnati laboratory a detailed report of the bacteriological and chemical findings for that month. It was also understood that, if any significant lapse in the quality should occur, the Cincinnati laboratory would be notified at once. Careful checking at intervals has shown that uniformity of technique was satisfactorily established and maintained.

This uniform method of bacteriological analysis and reporting continued in effect from 1922 to the last of December, 1929, thus including the period of the present study. Because of the limited funds available, it became necessary to discontinue the cooperative arrangement with Ashland in 1925 in order to include Wheeling when the new filter plant was opened in the latter city. However, no changes were made in the routine methods at Ashland, and so the records from that plant continued to be comparable. Administrative difficulties in Steubenville made satisfactory plant operation extremely difficult at times, but this did not affect the character of the laboratory work.

Typhoid fever statistics.—The reporting of both cases of and deaths from typhoid fever is required by law in each of the six cities studied.

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[2] Streeter, H. W.: Studies of the efficiency of water purification processes. Public Health Bulletin. No. 172.

[3] See appendix to Public Health Bulletin No. 172, p. 414.

The reporting of deaths is complete, and the only errors likely to have crept into the typhoid mortality statistics are those due to mistakes in diagnosis. One such error was discovered within the period of this study and very likely a few others did occur. The mortality records used in preparing the various tables were obtained by personally searching the original death certificates. Each city serves as the hospital and medical center for a considerable surrounding territory and it is, therefore, natural that many cases of illness, particularly serious illness, should be brought to the city for treatment. In making up the mortality figures every effort has been made to exclude all deaths of persons who certainly were nonresident. This is correction for residence and source of infection in only one direction, but it was the opinion of health officers and physicians that few, if any, residents contracting typhoid fever went elsewhere for treatment. Because of the low urban typhoid incidence it is also improbable that any considerable number of nonresident persons could have been infected while visiting within these cities. Because of this correction for residence, the figures used for the present study will not agree with rates reported from official sources.

Typhoid fever morbidity reporting is required in each city studied; but the actual records available were for the most part incomplete except in Wheeling, where the reporting is excellent. Besides making use of all morbidity information available from both city and State official agencies for the years 1927 and 1928, personal calls were made on the physicians in each city, inquiry was made in the families in which typhoid fever had occurred as to their knowledge of other cases, and, in addition, other persons (such as the filter-plant operators, directors of independent nursing agencies, hospital superintendents, directors of diagnostic laboratories, milk dealers, and sanitary inspectors) were questioned as to their knowledge of illness which might have been typhoid fever. Leads thus obtained were personally investigated. For these reasons the morbidity figures reported in this study are considerably more nearly complete for some of the cities than those reported through the usual official channels, and it is believed that the records as reported show essentially all the cases actually occurring for these two years. Nonresident cases were excluded whenever the information seemed authentic.

QUALITY OF THE WATER

Raw Ohio River water.—Evidence as to the grossly polluted character of the raw Ohio River water scarcely need be presented, since this stream serves as the final source of disposal for the sewage from each sewered community on the Ohio River watershed and also for an enormous quantity of industrial waste discharged by a variety of

industries. Surg. W. H. Frost and his associates[4] of the Public Health Service discuss at some length the polluted character of the river water and they also give some indication of the very large volume of domestic wastes discharged into the river and its tributaries in 1914. By 1927 this volume had greatly increased, both because of the actual population increases and because of the extension of the sewerage systems within each city. So far as is known, essentially all of these systems discharge untreated sewage into the Ohio River or its tributaries.

Besides this knowledge of the number of people contributing their excreta into the Ohio River water, bacteriological records are available which give the *B. coli* indices of the raw river water at the various municipal intakes. The following figures showing the yearly mean *B. coli* index of the untreated Ohio River water, as indicated from the examination of water samples collected at frequent intervals during the year, give a more definite indication of the degree of pollution present.

B. coli per 100 c. c. in Ohio River water at intakes of certain cities (Indices expressed as the annual means)

Year	East Liverpool	Steubenville	Wheeling	Ashland	Ironton	Portsmouth
1914[1]	9,500	2,230	3,950			2,750
1924	6,450	6,690		22,400	16,700	4,270
1925	11,600	1,630		10,500	16,300	4,900
1926	24,900	6,230		24,900	27,700	5,050
1927	15,500	2,710	1,460	28,100	20,900	5,310
1928	13,300	10,000	7,500	19,400	18,500	6,160

[1] Indices for this year represent the means obtained in the 1914 studies (Public Health Bulletin 143, Table 84) and do not include each month of the year. The sampling points used are near but not identical with those for the other years included in this table. There was no sampling point opposite Ironton in 1914 and Ashland then used water from the Big Sandy River

The data give in numerical terms some indication of the extent of pollution present in the water opposite each city. The amount of sewage pollution present in the water at each intake is determined by a combination of factors such as the proximity and size of the urban populations living up river, the volume of the stream, its rate of flow, and seasonal influences. Thus East Liverpool is only 44 miles below the city of Pittsburgh with its enormous output of sewage, but the bacterial pollution at East Liverpool is far less than would be anticipated, due to the bactericidal action of the acid wastes entering the river and to the long period of detention usually intervening. By the time the river water reaches Wheeling it has traveled 90 miles and has had a relatively small amount of waste added since leaving Pittsburgh, so that the pollution here is usually less than at East Liverpool and Steubenville. The Ashland intake, 320 miles below

[4] Frost, W. H., et al.: A study of the pollution and natural purification of the Ohio River. Public Health Bulletin No. 142.

Pittsburgh, is only six miles down stream from Huntington, W. Va., a city of approximately 75,000 people. Ironton is only 7 miles below Ashland. While the volume of domestic sewage contributed to the river by Huntington is much less than the Pittsburgh contribution, the distance from Huntington to Ashland and Ironton is too short to permit of any appreciable natural purification, and so the *B. coli* indices of the river water at the Ashland and Ironton intakes are consistently higher than at any other intake on the entire river. The influence of natural purification has made itself felt by the time the water reaches the Portsmouth intake, which is 353 miles below Pittsburgh and 26 miles below Ironton.

It is possible that the *B. coli* index does not have the same sanitary significance at each intake and especially that there may be a seasonal or year-to-year variation in its significance. The destructive action of the forces at play in the natural purification of streams may not be as effective against the colon bacillus as against the typhoid bacillus. Freshness of sewage is an important factor, since the typhoid bacillus probably does not multiply in such artificial environments. The amount and character of the industrial wastes contained in the water may have a more lethal effect on the typhoid bacillus than on the more resistant *B. coli* group. The conditions at East Liverpool lead one to suspect that the highly acid coal-mine and steel-mill wastes which have been added to the river in the Pittsburgh sector may be particularly destructive to the typhoid bacillus. Then again the very considerable decline in typhoid prevalence throughout the Ohio River valley, as elsewhere, has resulted in a proportional decrease in the number of typhoid organisms actually added to the river water though increased susceptibility due to decreased exposure may more or less completely counterbalance any falling off in the number of typhoid bacilli present.

It is interesting to speculate on the relative significance of the *B. coli* indices for the six raw water supplies. The assumption is that raw water of such quality would be highly dangerous if used for drinking purposes. Data which would directly answer the question for the period of the present study are not available, since no urban community has used untreated Ohio River water for drinking purposes since 1925. We can, however, compare the quality of the drinking water and the typhoid incidence before and after the installation of the present modern purification system in each city. The final stage of this installation took place as recently as 1925 in the city of Wheeling. In every city, improvement in the water supply has been followed by an immediate and notable decline in the prevalence of typhoid fever. The only deduction possible from the history of these cities while using raw river water is that the consumption of raw Ohio River water by the inhabitants for the years

1927 and 1928 would have resulted in a very high typhoid fever incidence.

Quality of the adequately treated waters.—In the Appendix of this paper brief histories of the six municipal water supplies are given. Portsmouth, in 1915, was the first city to treat the public water supply in a manner now considered adequate. Wheeling, the last of the six cities to adopt adequate water-purification measures, began the use of filtered water in February, 1925. Thus, by the time of the present study, 1927 and 1928, each plant undoubtedly had gone through its shaking-down period and was operating smoothly.

TABLE 1.—*A summary of the B. coli content of the treated public water supply effluents in the six designated Ohio River cities for the years 1926, 1927, and 1928* [1]

City	Year	Number of sampling days	Number of sampling days on which the total number of B. coli per 100 c. c was—							Number of sampling days B. coli index exceeded 1 per 100 c. c.	Typhoid fever rates per 100,000	
			2	4	6	8	10	100	1,000		Mortality	Morbidity
East Liverpool	1926	349	38	37	22	13	12			122	4.4	4.4
	1927	328	28	16	12	7	6	1		70	0.0	0.0
	1928	366	29	14	5	5	3			56	0.0	17.1
Steubenville	1926	295	37	7	5	2	1			52	0.0	
	1927	292	4	1	0	1				6	6.0	24.1
	1928	305	5	4	2	2				13	2.9	14.8
Wheeling	1926	365	32						1	33	1.7	22.1
	1927	365	17							17	0.0	11.0
	1928	366	11	10						21	0.0	6.7
Ashland	1926	365	1							1	7.8	28.7
	1927	365	0							0	3.8	75.2
	1928	366	0							0	0.0	88.2
Ironton	1926	364	8							8	6.4	75.0
	1927	365	7							7	0.0	40.7
	1928	306	21							21	0.0	33.7
Portsmouth	1926	347	6							6	5.1	38.1
	1927	362	7							7	0.0	24.7
	1928	365	8							8	12.2	62.9

[1] See Appendix, Table A, for more detailed data.

A record of the almost daily bacteriological analyses of each filter plant effluent water for the years 1926, 1927, and 1928 is given in Appendix, Table A, in the form of monthly summaries. These figures are further summarized in Table 1. It will be seen from these tables that at no time during the entire three years did the recorded *B. coli* index in Portsmouth, Ironton, or Ashland exceed 2 per 100 c. c., that is, at no time did more than one of the five 10-c.c. fermentation tubes planted for each analysis show *B. coli* fermentation. Wheeling had one analysis in June 1926 which showed *B. coli* present in 0.01 c. c. of effluent water. A sudden and unusual turbidity change in the river water occurred during the temporary absence of the plant operator, when some improperly treated water had passed through the plant into the clear well before the operator could be called and the necessary operative changes could be made, but the

lapse is known to have been only of a few hours' duration. More frequent lapses occurred in both Steubenville and East Liverpool, particularly in the latter, but with one exception the index did not exceed 10 per 100 c. c. The altogether too frequent failures to maintain a high standard at the East Liverpool plant were due to a misinterpretation of the methods of calculating the confirmed *B. coli* index under the Treasury Department standard. For some reason the *B. coli* confirmation was changed from the 48-hour to the 24-hour gas tube, resulting in a *B. coli* index below that which would have occurred had the standard methods been followed. Fortunately the 48-hour confirmation had been in use for a sufficient period of time (over two years) to give a fair indication of the percentage of 48-hour gas confirmations obtainable during each month of the year. These percentages have been applied to the reported 48-hour gas formation index where necessary in East Liverpool for the years 1926, 1927, and 1928, so that the *B. coli* data contained in Table 1, and Appendix Table A, are based on the actually confirmed results, or on calculations made in the manner just described. Any error introduced by this method of estimating the 48-hour confirmed *B. coli* is not sufficiently great materially to affect the interpretations.

Quality of the inadequately treated waters.—Except for this lapse in East Liverpool the drinking waters provided the six cities during 1927 and 1928 were of excellent quality. It becomes necessary to go further back into the records in order to find periods when the water supplies were inadequately treated, but we are then confronted with the fact that bacteriological records are either entirely lacking or are very meager.

Ashland, prior to the inauguration of the present plant in 1922, had for a number of years used water from a plant situated on the Big Sandy River at Catlettsburg, Ky. A limited number of *B. coli* determinations were made on the raw water during the five months beginning with June 1914, for which period the mean index was 1,260 per 100 c. c. A total of 14 analyses of the treated water were made during the same period, and these showed the *B. coli* indices varying from less than 2 per 100 to 1,000 per 100 c. c., with a mean of 90 for the period.

The East Liverpool plant was operated from June 1916 to Septem-1922 with untrained personnel, directed by a part-time, though competent, supervisor. The records of the few bacteriological analyses made have been lost, but it is known that the quality of the effluent water was not uniformly good.

Wheeling affords the most satisfactory record, even though it is very incomplete, of a gradual progression from the use of raw river water to a supply which meets modern sanitary requirements. All of the available bacteriological analyses made since 1910 have been

summarized in Table 2, where they are set off according to the character of the water provided. The data are deficient for the years 1918 to 1924, both inclusive, in that 48-hour gas formation was reported as *B. coli* without confirmation, and because the range dilutions used in determining gas formation was not sufficiently great always to insure a negative result in the highest dilution. Therefore, the maximum observed indices and the mean indices reported in Table 2 for these years (1918–1925) are generally too low. An analysis of the reported bacteriological determinations for the period 1918–1924 indicates that, even with the haphazard method of chlorination employed and the absence of regular laboratory control, an average index of 20–50 per 100 c. c. was obtained, which is an improvement on the raw river water previously supplied.

TABLE 2.—*The B. coli indices of the public water supply of Wheeling, W. Va. for certain years; also a record of the reported typhoid fever cases and deaths (corrected for residence) occurring during these years within the city boundaries as existing in 1914*

Year	Chronological number of the sampling months	Actual number of sampling days	B. coli index per 100 c. c.[1]: Per cent of sampling days index exceeded 1 per 100 c. c.	B. coli index per 100 c. c.[1]: Mean of actual sampling days	B. coli index per 100 c. c.[1]: Maximum observed index	Typhoid fever: Reported cases	Typhoid fever: Reported deaths
RAW OHIO RIVER WATER							
1914	4, 5, 6, 7, 8, 9, and 10	([2])	59	1,996 5	10,000	69	20
1915						63	15
1916						79	9
1917						153	12
YEAR OF CHANGE TO CHLORINATED SUPPLY							
1918	5, 6, 7, and 8	8	100	109.5	1,000	120	13
CHLORINATED OHIO RIVER WATER							
1919	1, 3, and 4	5	100	49.1	100	26	3
1920	All but 5 and 9	18	78	27 5	100	37	7
1921	1, 2, 3, and 4	7	86	47.1	100	19	8
1922	All months	108	55	24 8	100	15	4
1923	1, 2, 4, 7, 8, 9, and 10	21	43	8.6	100	17	3
1924	All but 5, 8, and 9	30	87	20.3	100	25	4
YEAR OF CHANGE TO FILTERED SUPPLY							
1925	All but 1 and 2	306	1	0.03	10	21	1
RAPID SAND FILTRATION WITH CHLORINATION OF OHIO RIVER WATER							
1926	All months	365	90	3.4	[3] 1,000	9	0
1927	do	365	47	.09	2	5	0
1928	do	366	57	.17	4	2	0

[1] The *B. coli* indices for the years 1918–1924, inclusive, are based on the 48-hour presumptive test. An average of 80 per cent of the raw water 48-hour gas formers at Wheeling will confirm as *B. coli*. The range of dilutions used for 48-hour gas determination for the years 1918–1924 was not sufficiently great always to insure a negative result in the highest dilution. Therefore, the maximum and mean indices recorded in this table for this period may in some instances be too low.

[2] 3 days each week.

[3] An operative breakdown occurred of a few hours' duration. The actual quality of the water coming from the taps in the city is not known. The mean index without this one high count is 0.17 per 100 c. c., and the maximum observed index 2 per 100 c. c.

TYPHOID FEVER HISTORIES

The history of typhoid fever prevalence in the six river cities studied, as revealed from a search of all the death records in each city, is given in Table 3. Every effort has been made to include in this tabulation only authentic typhoid fever deaths of actual residents. The mortality rates have been computed from population estimates based on the 1910, 1920, and 1930 Federal Census returns. These estimates are recorded in the Appendix Table B.

TABLE 3.—*The annual number of deaths (corrected for residence) in each Ohio River city studied for the period 1910–1928, inclusive, and the yearly death rates per 100,000 population.*

Year	Deaths from typhoid fever						Death rate per 100,000					
	East Liverpool	Steubenville	Wheeling	Ashland	Ironton	Portsmouth	East Liverpool	Steubenville	Wheeling	Ashland	Ironton	Portsmouth
1910	12	8	11	------	8	15	58.9	35.5	26.4	------	22.8	63.4
1911	13	7	9	6	14	18	63.4	30.3	21.6	63.5	105.8	73.0
1912	8	16	17	9	14	18	38.9	67.4	40.9	89.5	105.0	70.2
1913	14	10	16	7	9	30	67.6	41.0	38.6	65.5	67.0	113.0
1914	19	17	20	2	10	[1] 33	91.4	63.0	48.1	17.7	74.0	[1] 119.3
1915	11	[1] 11	15	2	4	7	52.5	[1] 42.8	36.2	16.8	29.4	24.5
1916	9	6	9	6	7	4	42.7	22.8	21.6	47.7	51.1	13.5
1917	6	[2] 13	12	6	13	5	28.4	[2] 48.2	29.0	45.6	94.4	16.4
1918	11	1	13	8	14	6	51.7	3.6	31.4	58.0	101.0	19.1
1919	5	2	3	4	3	8	23.4	7.1	7.2	27.8	21.5	24.6
1920	6	3	9	2	10	5	27.9	10.4	16.0	13.3	71.5	14.9
1921	6	1	[2] 16	3	[1] 0	0	27.9	3.4	[2] 28.2	14.2	[1] 0.0	0.0
1922	[1] 3	0	5	[1] 1	2	3	[1] 13.8	0.0	8.7	[1] 4.5	13.7	8.5
1923	0	0	2	0	1	3	0.0	0.0	3.4	0.0	6.7	8.3
1924	1	1	[2] 11	1	1	1	4.5	3.2	[2] 18.8	4.2	6.6	2.7
1925	0	2	[1] 3	[3] 10	1	1	0.0	6.2	[1] 5.1	[3] 40.3	6.5	2.6
1926	1	0	2	2	1	2	4.4	0.0	3.3	7.8	6.4	5.1
1927	0	2	0	1	0	0	0.0	6.0	0.0	3.8	0.0	0.0
1928	0	1	0	0	0	5	0.0	2.9	0.0	0.0	0.0	12.2

[1] The new water purification plant with full time operative and laboratory control began operation in this year.
[2] Localized epidemics due to pollution of local community wells.
[3] A sharp increase occurred in the typhoid incidence throughout this section of Kentucky in this year. No apparent connection with the public water supply in Ashland was evident.

In order to demonstrate more clearly the relation which the drinking water had to the typhoid fever prevalence a summary table (Table 4) is presented, which shows for each city the mean mortality rate during the 3-year period immediately preceding and the three years immediately subsequent to any significant change in the quality of the water supply, omitting in each instance the year in which the change became effective. Notations appearing as footnotes indicate the character of the changes taking place.

It should be emphasized at this time that these improvements in the quality of the water supply became effective within the space of a very short time. Other sanitary improvements, such as the extension of the sewerage systems with the accompanying elimination of the privy, elimination of fly hazards, greater protection of the city's milk supply etc., were taking place concurrently. However, such changes came about very slowly and in a piece-meal fashion,

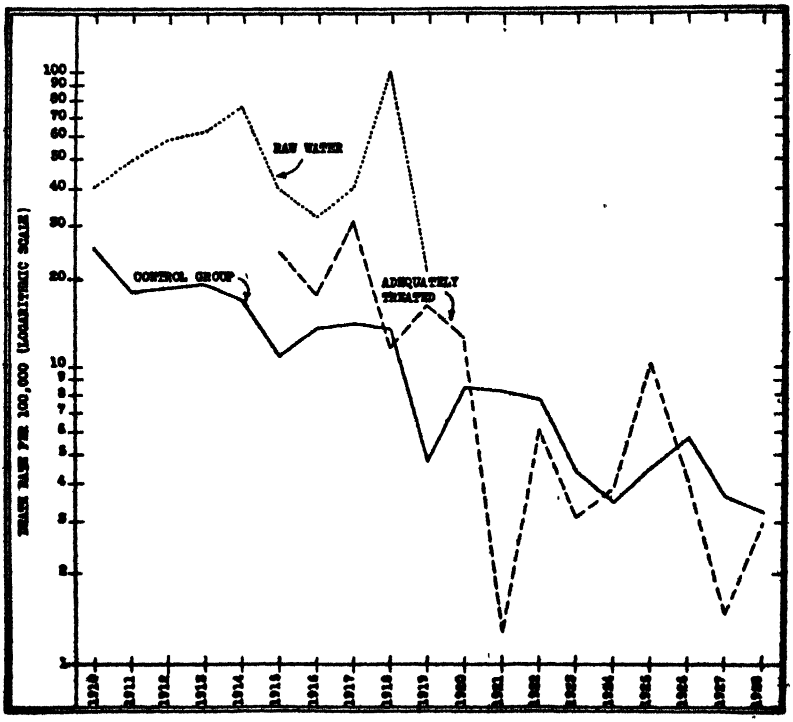
and they could have had but little part in the great and sudden decreases in the typhoid rates which are shown in Table 4. Such pronounced changes in the typhoid death rates could only be brought about by a sudden and radical alteration in some major typhoid-producing factor. Nothing of this nature occurred in any of the six cities, at the times indicated in Table 4, except an improvement in the quality of the public drinking water supply. The influence of improvements in the other typhoid factors probably explains in part the gradual decline in the typhoid rates which has taken place in each city during the years since the elimination of the public water supply as the major factor.

TABLE 4.—*The typhoid fever death rates in certain Ohio River cities in (a) the three years preceding and (b) the three years following major improvements in their public water supplies*

City	3-year period before improvement				3-year period after improvement			
	Years	Combined population	Total deaths	Mean rate	Mean rate	Total deaths	Combined population	Years
Portsmouth [1]	1912–1914	79,872	81	101.4	16.4	15	91,665	1916–1918
Steubenville [1]	1913–1915	75,201	38	50.6	19.3	[2] 16	82,833	1917–1919
East Liverpool [3]	1915–1917	63,174	26	41.1	26.4	17	64,537	1919–1921
Wheeling [4]	1915–1917	124,680	36	28.9	18.1	[5] 28	154,512	1919–1921
Ironton [6]	1917–1919	41,583	30	72.2	6.9	3	43,691	1921–1923
Ashland [7]	1917–1919	41,430	18	43.5	15.3	[8] 11	71,679	1923–1925
East Liverpool [9]	1919–1921	64,537	17	26.4	1.5	1	66,570	1923–1925
Wheeling [10]	1922–1924	173,808	[11] 18	10.4	1.1	2	180,720	1926–1928

[1] Changed from raw river water to filtered and chlorinated supply.
[2] Includes localized epidemic not related to public water supply. With epidemic year removed, rate is 5.4.
[3] Changed from raw river water to inadequately controlled filtered and chlorinated supply.
[4] Changed from raw river water to chlorinated supply
[5] Includes localized epidemic not related to public water supply. With epidemic year removed, rate is 12.3,
[6] Changed from raw river water to filtered and chlorinated supply
[7] Changed from inadequately filtered Big Sandy river water to filtered and chlorinated Ohio River water.
[8] Includes localized epidemic not related to public water supply. With epidemic year removed, rate is 2.1.
[9] Changed from inadequately controlled filtered and chlorinated supply to one adequately controlled.
[10] Changed from chlorinated supply to filtered and chlorinated supply.
[11] Includes localized epidemic not related to public water supply. With epidemic year removed, rate is 6.1.

The data given in Table 3 have been rearranged in Table 5 in order to show the combined typhoid histories of these six cities since 1910 on the basis of the quality of the public water supplies; (*a*) all cities using raw river water; (*b*) all cities using inadequately treated river water; (*c*) those using effectively purified supplies; and (*d*) a control group consisting of eight cities, situated on the Ohio River watershed, of approximately the same size as those in the study group and which had, at the time of the 1914 sanitary survey, a public water supply rating 90 per cent or better. The rates recorded in Table 5 have been plotted in the accompanying graph.



Curves showing the death rates in the six Ohio River cities grouped according to the quality of the public drinking water; also the curve for a control group of cities. (A local epidemic appeared in Steubenville in 1917 and one in Ashland in 1925 which bore no demonstrable connection with the public water supply. See Table 3 and footnotes 2 and 3 to that table.)

TABLE 5.—*The typhoid fever death rates in certain Ohio River cities when their public water supply was (a) raw Ohio River water, (b) inadequately treated river water, and (c) adequately treated river water, and the rates in a control group of cities on the Ohio River watershed*

Year	Population using raw Ohio River water			Population using inadequately treated Ohio River water			Population using adequately treated Ohio River water			Control group comprising 8 cities [1]		
	Population	Typhoid fever		Population	Typhoid fever		Population	Typhoid fever		Population	Typhoid fever	
		Deaths	Rate		Deaths	Rate		Deaths	Rate		Deaths	Rate
1910	121,424	49	40.4							180,832	45	24.9
1911	123,223	61	49.5	9,442	6	63.5				188,536	34	18.1
1912	125,022	73	58.4	10,066	9	89.5				196,244	37	18.9
1913	126,816	79	62.3	10,690	7	65.5				203,944	39	19.2
1914	128,620	99	77.0	11,314	2	17.7				211,644	36	17.0
1915	101,827	41	40.3	11,938	2	16.8	28,592	7	24.5	219,352	25	11.4
1916	76,305	25	32.8	12,562	6	47.7	55,913	10	17.9	227,060	31	13.7
1917	76,487	31	40.5	13,186	6	45.5	57,530	[2] 18	31.5	234,764	33	14.1
1918	13,861	14	101.0	76,617	32	41.8	59,148	7	11.8	242,472	33	13.6
1919	13,948	3	21.5	77,336	12	15.5	60,765	10	16.4	250,176	12	4.8
1920				77,698	15	19.3	62,385	8	12.8	258,033	22	8.5
1921				78,449	22	28.0	78,292	1	1.3	263,912	22	8.3
1922				57,360	5	8.7	80,166	5	6.2	269,791	21	7.8
1923				57,936	2	3.4	127,044	4	3.1	275,670	12	4.4
1924				58,512	11	18.8	129,991	5	3.9	281,549	10	3.5
1925							132,938	[3] 14	10.5	287,428	13	4.5
1926							195,549	8	4.1	293,307	17	5.8
1927							199,072	3	1.5	299,186	11	3.7
1928							202,595	6	2.9	305,065	10	3.3

[1] The control cities selected are of approximately the same size, they are all located on the Ohio River watershed, and at the time of the 1914 sanitary survey each city had a public water supply which rated 90 per cent or more. The group included Canton, Chillicothe, Hamilton, Lancaster, Mansfield, Marion Massillon, and Middletown.

[2] See footnote 2 accompanying Table 3. With Steubenville omitted, rate becomes 16.4.

[3] See footnote 3 accompanying Table 3. With Ashland omitted, rate becomes 3.7.

The figures show a consistently high rate for cities using the raw river water and without any apparent tendency to decline. With the introduction of an inadequately treated supply the rates declined somewhat over those in group (*a*) but still remained very high as compared to the control group. The inauguration of an effectively treated supply caused a sharp decline in the typhoid rates so that these cities now compared very favorably with the control group which had been using presumably safe water at least since 1914. The death rate curve for group (*c*) cities falls even below that for the control cities. The conclusion is warranted that the installation of effective water purification systems in the six cities under consideration was sufficient to reduce the typhoid rates to the level existing in cities with approved water supplies. The remaining typhoid incidence in either group is no greater than could reasonably be accounted for as due to factors other than a contaminated water supply.

A more specific and striking illustration of the weight of the water supply as a typhoid factor is obtained by studying the record in Wheeling as given in Table 2. Up until October, 1918, the city-water mains delivered raw Ohio River water with a mean *B. coli* index of approximately 2,000 per 100 c. c., though only about 50 per cent of the population used it for drinking purposes. Even with this limited use the mean typhoid death rate for the six years preceding was 35.7 per 100,000. Then followed a period of slightly more than six years of indifferent chlorination without systematic laboratory control while the city fathers debated the type of water purification which Wheeling should have. Such treatment did reduce the *B. coli* index to an average of 30 per 100 and at the same time the typhoid death rate for the six years averaged 11.5 for that part of the population living within the 1914 city boundaries. (It has been necessary to retain the old city boundaries throughout Table 2 in order to have directly comparable population groups from year to year.) In February, 1925, the present purification plant became effective, and from that time until the end of 1928, when the present study ended, only one resident death from typhoid fever occurred within the 1914 city boundaries. Of the 15 cases reported for the years of effective water purification (1926, 1927, and 1928) within the 1914 city limits, 11, or 73 per cent, were reported within the 6-month period beginning with June. For the three years immediately preceding the year of beginning effective purification (1922, 1923, and 1924), 57 cases were reported, of which only 30, or 53 per cent, fell within the corresponding 6-month summer-fall period.

Seasonal distribution.—The monthly distribution of deaths from typhoid fever is shown in Table 6 and of reported cases in Table 7.

The combined figures for 3-year periods were used because of the relatively small number of deaths occurring, especially following water purification. The reported deaths and cases in Tables 6 and 7, respectively, have been set back to the actual month of infection where such information was available. In the absence of this information deaths were set back 40 days from the actual date of death and cases were set back 25 days from the date of reporting. These figures represent the average days as determined from a large group of cases in which complete information was available. This method was adopted so as to have uniform records for each city, irregularities in reporting cases making some method of adjustment necessary. The seasonal distribution of both cases and deaths for the 3-year period immediately prior to purification of the water supply corresponds to the accepted distribution for communities which use a heavily contaminated water throughout the year, the rate being uniformly high in each month, with a majority of the deaths occurring in the six months beginning with December (actually 54 per cent as compared to 46 per cent for the summer-fall season). This is similar to the curve reported by Freeman[5] for another group of Ohio River cities which in 1914 had a public water supply with a "safety rating" of less than 50. This uniformly high incidence before filtration is in sharp contrast to the low incidence and the summer-month grouping for the 3-year period ending with 1928, during which time the inhabitants used a good water supply. It will be seen from the data in the two tables that only 16.7 per cent of the deaths and 18.7 per cent of the reported cases occurred within the 6-month period beginning with December. This distribution curve agrees in character with the one presented by Freeman for cities having a public-drinking water with a safety rating of 90 or more.

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[5] Freeman, A. W.: Typhoid fever and municipal administration. Public Health Reports, vol. 32, No. 18, May 4, 1917.

Table 6.—*The distribution of deaths from typhoid fever by months in the six designated cities during a 3-year period immediately prior to the installation of the present public-water supply, and for a similar period ending with 1928 (deaths set back to estimated month of infection)*

Month	3-year period immediately prior to filtration								3-year period of 1926–1928, inclusive							
	East Liverpool	Steubenville	Wheeling	Ashland	Ironton	Portsmouth	Total	Percentage distribution	East Liverpool	Steubenville	Wheeling	Ashland	Ironton	Portsmouth	Total	Percentage distribution
January	5	8	4	1	1	7	26	11.1	0	0	1	0	0	0	1	5.5
February	1	4	2	0	6	7	20	8.5	0	0	0	0	0	0	0	0.0
March	3	4	2	0	2	9	20	8.5	0	0	0	0	0	0	0	0.0
April	0	3	2	0	3	16	24	10.2	0	0	1	0	0	0	1	5.5
May	2	0	3	0	2	8	15	6.4	0	0	0	0	0	0	0	0.0
June	3	9	2	1	4	3	22	9.4	0	0	0	0	0	1	1	5.5
July	2	5	3	6	3	5	24	10.2	0	0	0	0	0	1	1	5.5
August	0	1	3	3	2	5	14	5.9	0	1	0	2	0	2	5	27.9
September	3	1	3	1	4	4	16	6.8	0	2	0	1	0	0	3	16.8
October	0	0	4	2	3	2	11	4.7	0	0	0	0	1	2	3	16.8
November	3	2	4	3	2	7	21	8.9	0	0	0	0	0	2	2	11.0
December	4	1	4	1	2	10	22	9.4	1	0	0	0	0	0	1	5.5
Total	26	38	36	18	34	83	235	100.0	1	3	2	3	1	8	18	100.0

Table 7.—*The distribution of reported cases of typhoid fever by months in Ironton and Wheeling during a 3-year period immediately before the installation of the present public-water supply and a similar period ending with 1928 (cases set back to the estimated month of infection)*

Month	Before				After			
	Wheeling	Ironton	Total cases	Percentage distribution	Percentage distribution	Total cases	Wheeling	Ironton
January	13	16	29	5.9	11.1	6	6	0
February	8	16	24	4.9	3.7	2	2	0
March	5	22	27	5.5	0.0	0	0	0
April	6	15	21	4.3	1.9	1	1	0
May	7	19	26	5.3	5.5	3	0	3
June	67	8	75	15.3	5.5	3	3	0
July	51	12	63	12.7	18.5	10	6	4
August	31	17	48	9.8	24.1	13	6	7
September	20	12	32	6.5	16.7	9	4	5
October	36	18	54	11.0	11.1	6	2	4
November	27	21	48	9.8	0.0	0	0	0
December	20	24	44	9.0	1.9	1	1	0
Total	291	200	491	100.0	100.0	54	31	23

Note: Records are incomplete for the other four cities.

It is not permissible to infer, either from this marked decrease in the actual prevalence of typhoid or from the sharp reversal in the seasonal distribution following use of the new water supply, that no case of typhoid fever can originate from this new supply. However, from the low incidence and the character of the seasonal curve it is apparent that the possible number of persons thus infected has at least been very greatly reduced and that those avenues of transmission commonly at work in the summer and fall months now greatly predominate the picture.

Age.—Table 8 shows the age distribution of the reported cases before and after filtration of the water supply. The age curve following filtration has not changed materially from that existing when the general public drank raw river water. The age group, 0–19 years, provides 59.9 per cent of the cases before filtration and 59.2 per cent in the three years ending with 1928. This is in contrast with 47 per cent among all cases reported in Michigan, Minnesota, and Pennsylvania for the year 1913.[6] The higher figures for the younger group in the Ohio River cities are probably due to two entirely different factors. Before filtration all ages were almost constantly exposed with the younger ages constituting the only really susceptible group since the older ones had built up an immunity. Following filtration the percentage of cases occurring among the 0–19 age group remains high because persons in this portion of the population, besides being susceptible, are exposed more frequently to the predominating sources of infection.

TABLE 8.—*Age distribution of reported cases of typhoid fever immediately preceding and following the installation of effective water purification plants*

Age group	3-year period preceding installation				3-year period after installation			
	Wheeling	Ironton	Total cases	Percentage distribution	Percentage distribution	Total cases	Wheeling	Ironton
0 to 4	10	22	32	7.2	1.8	1	0	1
5 to 9	57	42	99	22.4	24.2	13	7	6
10 to 14	51	26	77	17.5	25.9	14	7	7
15 to 19	30	26	56	12.7	7.4	4	3	1
20 to 29	64	40	104	23.6	22.2	12	5	7
30 to 39	31	18	49	11.1	9.3	5	4	1
40 to 49	5	8	13	3.0	5.6	3	3	0
50 to 59	3	3	6	1.4	1.8	1	1	0
60 to 69	1	4	5	1.1	1.8	1	1	0
Total	252	189	441	100.0	100.0	54	31	23

NOTE.—Records are incomplete for the other four cities.

Sex.—The sex distribution is given in Table 9. There has been a slight increase since filtration in the percentage of infected males which could be explained on the basis of greater exposure among boys to present sources of infection.

Drinking water and typhoid fever prevalence.—An analysis of the bacteriological and typhoid fever data presented in Table 1 and Appendix Table A fails to show any correlation between the prevalence of typhoid fever and the bacterial quality of the public water supply. No significant lapses occurred in the quality of the Ashland, Ironton, or Portsmouth supplies, whereas the typhoid rates show considerable variation. A very brief but serious lapse did occur in Wheeling in June, 1926. Both the reported cases and deaths were

[6] Public Health Reports, vol. 30, No. 8, Feb. 19, 1915, p. 534.

greater in 1926 than in either 1927 or 1928, but neither the total numbers nor the most probable dates of actual infection suggests sufficient reasons for identifying them as related to the lapse in water quality. In fact a study of each individual case history suggests other more probable sources of infection. The poorest quality of drinking water is shown in East Liverpool, where slight but frequent lapses occurred each year; yet this city has been freer from typhoid fever than any of the other five. This city's morbidity records for 1926 are incomplete. A careful search was made for cases in both 1927 and 1928, and it is felt that the four cases reported for these two years represent a complete record of typhoid fever among the 23,000 inhabitants for these two years—a very low incidence.

TABLE 9.—*The sex distribution of persons reported with typhoid fever before and after the installation of the present public water supply*

City	Before filtration		After filtration	
	Male	Female	Male	Female
Wheeling	143	120	15	16
Ironton	84	105	14	9
Total	227	225	29	25
Percentage distribution	50.2	49.8	53.7	46.3

Certain distinct epidemics have occurred in two of the cities since they began the use of drinking water from the present purification plants. In 1917 Steubenville had a total of 13 deaths (Table 3) as compared with 6 in 1916 and only 1 in 1918. The history of the filter plant for that year records no operative lapse. Nine of the 13 deaths occurred in the five months beginning with June and were grouped in one section of the city surrounding a hillside spring. The reports of the attending physicians indicate that all nine persons had either drunk from this spring or were direct family contacts with infections in persons who had done so. Analysis of the spring water showed high *B. coli* pollution. Ten deaths occurred in Ashland in 1925 in contrast with one in 1924 and two in 1926. The quality of the water supply showed no lapse for this year. The distribution of the deaths in the city does not suggest a connection with the public water supply, inasmuch as many were in homes in sections of the city which are essentially rural and use water from other sources. While the cause for this increased prevalence remains unexplained, there is nothing about it which would incriminate the public water supply.

EPIDEMIOLOGY OF THE REPORTED 1927 AND 1928 CASES

By 1927 the prevalence of typhoid fever in the six cities studied had reached such a low point that a statistical analysis of the mortality and morbidity reports as given to the health departments fails to give

definite indication as to the possible source of infection. More specific information bearing on every phase of each individual case is needed before this residual typhoid fever can be explained. Even then it may not be possible to say with certainty that such and such is the mode of infection. The detailed case epidemiological histories should, however, be sufficient to judge the possible responsibility of any factor which is as common to all the inhabitants as the public water supply. Such case histories were obtained by personal interviews with the patient, the family, or both, in each city for the years 1927 and 1928. Contact could not be made with every case, but sufficient interviews were obtained to give very good samples.

The total number of cases obtained from the health department records and by personal search in each city was 78 in 1927, and 99 in 1928. Tables 10 and 11 have been arranged so as to show certain facts as to residence, diagnosis, numbers investigated, and history of direct contracts.

TABLE 10.—*Actual number of reported cases of typhoid fever for the year 1927 in each of the six Ohio River cities studied, and certain facts regarding each case*

Information regarding cases	East Liverpool	Steubenville	Wheeling	Ashland	Ironton	Portsmouth	Total
Total cases reported in each city in 1927	2	10	23	24	6	13	78
Nonresident cases included in reports	1	2	14	1	0	3	21
Actual resident cases reported for 1927	1	8	9	23	6	10	57
Cases not considered as typhoid fever	1	0	1	1	0	1	4
Resident cases accepted as typhoid fever	0	8	8	22	6	9	53
Resident cases not investigated	0	2	0	10	1	1	14
Resident cases investigated	0	6	8	12	5	8	39
Resident cases returning ill to city	-------	0	1	0	0	1	2
Considered actual resident cases	-------	6	7	12	5	7	37
Resident cases having direct contact with a known case	-------	1	1	6	0	2	10
Resident cases remaining and investigated	-------	5	6	6	5	5	27

TABLE 11.—*Showing the actual number of reported cases of typhoid fever for the year 1928 in each of the six Ohio River cities studied, and certain facts regarding each case*

Information regarding cases	East Liverpool	Steubenville	Wheeling	Ashland	Ironton	Portsmouth	Total
Total cases reported in each city in 1928	4	6	17	38	6	28	99
Nonresident cases included in reports	0	1	10	10	1	2	24
Actual resident cases reported for 1928	4	5	7	28	5	26	75
Cases not considered as typhoid fever	0	0	2	1	0	0	3
Resident cases accepted as typhoid fever	4	5	5	27	5	26	72
Resident cases not investigated	0	0	0	0	0	4	4
Resident cases investigated	4	5	5	27	5	22	68
Resident cases returning ill to city	1	0	1	2	0	5	9
Considered actual resident cases	3	5	4	25	5	17	59
Resident cases having direct contact with a known case	1	0	0	8	1	10	20
Resident cases remaining and investigated	2	5	4	17	4	7	39

For the year 1927 (Table 10) 21 of the reported cases were nonresidents who were brought to the city for care and treatment. Four others gave atypical symptoms, and so were not considered as typhoid fever, and 14 cases, though not personally investigated, were believed to have been genuine typhoid cases. Similarly in 1928 (Table 11) 24 were proved nonresident cases, 3 had atypical symptoms and negative Widal reactions, and 4 were not investigated. There remained 39, or 74.5 per cent of all the actual resident cases reported in 1927, and 68, or 94.5 per cent reported in 1928, which were personally investigated by the writer. It was found that four of the 1927 cases and nine in 1928 occurred in proved residents who had been absent from their home city for more than the possible incubation period and returned to their homes only after the onset of symptoms. These cases were, therefore, not considered further. The symptomatology and clinical picture in each of the remaining cases conformed to those of typhoid fever. Widal or blood culture examinations were made on 16 cases in 1927 and on 41 cases in 1928. Positive findings were obtained in 100 per cent of the 1927 cases and in 97.6 per cent of the 1928 cases.

The record of cases is believed to be approximately complete, since in 1927 there occurred 3 typhoid deaths as against 53 recorded genuine resident cases and in 1928 6 deaths and 72 similar cases.

An analysis of the epidemiological case histories of the 39 cases investigated in 1927 reveals the fact that 10 had had direct and intimate contact with a previous case in their own household, or in that of a relative. Similarly, in 1928, of the 59 cases studied, 20 cases gave such a history of contact. Since the danger of acquiring infection from such exposure, especially in the types of homes wherein these cases actually occurred, was so much greater than from any other known source, it did not seem necessary to study these 30 cases further. There remains a group of 66 cases for the 2-year period which occurred in persons who gave evidence of exposure to a variety of possible sources of infection. The cases were widely scattered in each city and were sporadic in character.

TABLE 12.—*A summary of the epidemiological histories of the persons reported with typhoid fever in the six Ohio River cities who were not eliminated in Tables 10 and 11, and who did not give a history of direct contact*

	1927 (27 resident cases considered)		1928 (39 resident cases considered)		2-year totals (66 resident cases considered)	
	Number	Per cent	Number	Per cent	Number	Per cent
Onset June to November (both inclusive)	25	92.5	32	82.0	57	86.4
Absence from city within 30 days	16	59.2	21	53.9	37	56.0
No public water supply in home	3	11.1	10	25.8	13	19.7
No sanitary sewer connection in home	4	14.8	21	53.8	25	37.9
Economic status of home poor to fair	21	77.8	32	82.0	53	80.3
Sanitary status of home poor to fair	21	77.8	30	77.0	51	77.3
Drinking known polluted water or water of unknown quality or swimming therein	24	88.9	37	95.0	61	92.5

The more significant facts are summarized in Table 12. The figures in this table suggest a picture which was not common to the entire population of the six cities. Fifty-six per cent of the infected persons had been absent from the city within the 30 days just prior to the onset of symptoms; a turnover which was probably much greater than for the population as a whole. The very definite summer-fall grouping observed in Table 7 is slightly more pronounced for the cases remaining in Table 12. From information collected at the time of making a sanitary survey of each city in 1928, it is estimated that less than 5 per cent of the combined 6-city population used water other than the public water supplies in their homes for drinking purposes. Actually 19.7 per cent of the cases reported in Table 12 were without the public water supply. Similarly the homes of approximately 20 per cent of the entire combined population were not connected to the sanitary sewers, as compared with 37.9 per cent of the homes having typhoid cases in 1927 and 1928. No information was available which gave the exact economic and sanitary status of each household in the six cities. However, it is a known fact that the percentage of families in the population as a whole who were in economically "poor to fair" circumstances, or who lived under "poor to fair" sanitary surroundings, fell far below the very high percentage recorded for those households in which cases occurred. This was even more strikingly illustrated from the home visits made to each case. The definite grouping of the cases into sections of the cities where economic and sanitary conditions were low was very evident. The character of the homes and the type of the occupants in a large majority of the homes in which cases occurred were the same in each city. There existed a seeming indifference to economic improvement, and the desire for sanitary or hygienic surroundings in the home seemed never to have been acquired.

With approximately 95 per cent of the combined population in the six cities studied supplied with public drinking water, the opportunity for the average citizen to obtain other water for drinking purposes was greatly limited. Also it is believed that the portion of the population is not very large which will go swimming when the only facilities are a known grossly polluted and muddy river or some less accessible body of water. Actually 92.5 per cent of the cases occurred in persons who either drank known polluted water or water of a suspicious or unknown character, or went swimming, wading, or playing in such waters.

The age distribution of the reported cases as given in Table 8 shows that 62.3 per cent were less than 20 years of age. Of the 66 cases analyzed in Table 12, 75.8 per cent were less than 20 years of age, as compared to 47 per cent reported by three of these six cities in 1913. This fact further strengthens the belief that the chief source or sources

of infection to which the population was exposed in 1927 and 1928 were particularly peculiar to the activities of childhood.

The epidemiological picture which is constructed from the histories of the 66 cases analyzed in Table 12 strongly suggests that the source or sources of these infections were some factors peculiar to travel away from home, to poor sanitary surroundings and indifference to personal cleanliness, to the ingestion of polluted drinking waters from private sources, or to two or more of these factors in combination. The major typhoid factor was also one to which persons under 20 years of age were exposed more frequently than were older persons, though here susceptibility may have been a slight factor. The epidemiological picture gives no evidence that the public water supplies which were used by approximately 95 per cent of the entire population could have been the disseminating factor in any significant number of these cases if, in fact, it could have been the factor in a single case.

SUMMARY AND CONCLUSION

This study of the relation between the residual typhoid fever and the quality of the municipal public water supplies in the six designated Ohio River cities, as indicated by *B. coli* index, may be summarized in the following manner:

1. The Ohio River is the source of the public water supply for each city studied. Originally this was supplied to the public without treatment, but at the time of this report all six supplies are treated by coagulation-sedimentation-filtration and disinfection with chlorine. Prior to the installation of effective treatment the public drinking water had an excessively high *B. coli* index during each month of the year. Following purification, as indicated by the years 1926, 1927, and 1928 (Table 1 and Appendix Table A) the *B. coli* index of the Portsmouth supply was less than 2 per 100 c. c. for 98.1 per cent of the days, Ironton 96.7 per cent, Ashland 99.9 per cent, Wheeling 93.6 per cent, Steubenville 92.1 per cent, and East Liverpool 76.8 per cent. The Portsmouth, Ironton, and Ashland supplies never exceeded an index of 2 per 100 c. c. Wheeling exceeded this index on 1.0 per cent of the days, Steubenville on 2.9 per cent, and East Liverpool on 14.4 per cent.

2. During the period of raw water consumption the typhoid fever incidence in each city was uniformly very high in every month of the year—a seasonal distribution which is typical of endemic water-borne typhoid fever. Following the installation of the present public water supplies the typhoid incidence promptly fell to a low rate comparable with rates prevailing in other cities on the Ohio River watershed which have had, at least since 1914, safe water supplies. At the same time the seasonal distribution changed so as to give a definitely summer and fall disease.

3. A detailed epidemiological study of the cases of typhoid fever reported in these six cities during 1927 and 1928 failed to reveal any evidence, either direct or presumptive, which in any way implicated the public water supply as a vehicle for the transmission of the disease. Ample evidence did accumulate to indicate that other modes of transmission were in all probability the route of contact.

4. Therefore, the conclusion seems justified on the basis of the evidence presented in this study that the quality of the public water supplies for the years 1927 and 1928 in the six Ohio River cities studied was sufficiently good to eliminate the public drinking water as a measurable source of typhoid fever infection.

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Appendix

The history of the public water supplies of the six cities included in the present study, beginning with 1910, is presented in the following abstract form:

East Liverpool.—From 1910 to June, 1918, raw Ohio River water with a brief storage period in an open reservoir. It was estimated in 1914 that this supply was used by 75 per cent of the population. A modern rapid sand filtration plant with chlorination went into operation in June, 1918. This plant was then operated for some time under part-time technical supervision and without adequate laboratory control. It is considered that during this period the sanitary control was inadequate. Since October, 1922, the plant has been operated under full time competent supervision and daily laboratory control. At least 98 per cent of the population used the public supply exclusively in 1928. The remaining 2 per cent used well water of good quality.

Steubenville.—From 1910 to January, 1916, raw river water was pumped directly into the city mains. By January, 1916, a modern rapid sand filtration plant with chlorination had been completed and placed in operation. It has been continuously operated since that time under full time competent supervision with daily laboratory control. Approximately 70 per cent of the population drank raw river water in 1914, whereas in 1928 at least 98 per cent used the

purified public supply. A few wells still remain in use in isolated sections.

Wheeling.—From 1910 to October, 1918, the public supply was raw Ohio River water, pumped directly into the mains. Approximately 49 per cent of the population used this supply in 1914 while the other 51 per cent used water from wells and springs or bottled water. The quality of these private supplies was on the average better than the public supply. In October, 1918, the city began to chlorinate the raw water. Hypochlorite was added without proper supervision and without laboratory control. This quality of water continued to be used up until March, 1925. A modern rapid sand filtration plant was then placed in operation under full time competent supervision and daily laboratory control. It was estimated in 1928 that 99.5 per cent or more of the city's population used the public supply with the remainder depending on wells.

Ashland.—For some years prior to 1910 and until September, 1920, the public water supply of Ashland was delivered from a privately owned filter plant situated on the Big Sandy River near Catlettsburg, Ky. A survey was made of the plant in 1914, at which time it was found to be inadequate to produce a water of satisfactory quality, and operated by untrained personnel and without laboratory control. The sanitary rating of the Ashland public supply was then placed at not over 25 per cent. It was being used by approximately 70 per cent of the people, while the remaining 30 per cent depended upon well, spring, and cistern water of varying quality. In September, 1920, the city completed its municipally owned water works which draws water from the Ohio River shortly above Ashland but below the mouth of the Big Sandy River. This plant is of the rapid sand filtration type with chlorination. It was not until July, 1922, that the plant was in full operation under full-time supervision and with laboratory control. By 1928 approximately 75 per cent of the inhabitants used the public supply. Persons living in the more isolated sections, or because of personal peculiarities, still depended upon wells or springs.

Ironton.—Until May, 1920, raw Ohio River water was pumped into the city public water system without any treatment. It was estimated in 1914 that only 60 per cent of the inhabitants used this supply. The remaining 40 per cent depended on wells and cisterns filled with rain water or cisterns filled with water from the public supply. In May, 1920, a modern rapid sand filtration plant with chlorination was placed in operation under competent full-time supervision and with daily laboratory control. Approximately 98.5 per cent of the people used this supply in 1928.

Portsmouth.—Raw Ohio River water used as the public supply until the close of 1914. The 1914 sanitary survey showed that approxi-

mately 90 per cent of the population used this raw water supply entirely or in part. The new modern rapid sand filtration plant with chlorination went into operation in December, 1914, under trained full-time supervision and with daily laboratory control. This supply was used by 98 per cent of the population in 1928. The remaining 2 per cent used private supplies, some of which were known to have been unsatisfactory.

TABLE A.—*The observed B. coli quality of the public water supplies of the following designated cities summarized by months for the years indicated; also a record of the reported typhoid fever cases and deaths for the corresponding months*

EAST LIVERPOOL, OHIO

Month	Number of sampling days	B. coli index per 100 c. c.			Typhoid fever	
		Days index exceeded 1 per 100 c. c.	Mean monthly index	Maximum of the observed daily indices	Reported cases	Reported deaths
1926						
January	29	19	3.92	10.0	0	0
February	28	18	3.7	10.0	0	0
March	30	19	3.3	10.0	0	0
April	30	17	2.1	8.0	0	0
May	28	0	0.0	0.0	0	0
June	27	5	0.5	6.0	0	0
July	30	2	0.16	4.0	0	0
August	28	10	1.1	10.0	0	0
September	30	12	1.37	10.0	0	0
October	30	4	0.64	10.0	0	0
November	30	9	1.01	8.6	0	0
December	29	7	0.88	6.0	1	1
1927						
January	29	6	1.05	10.0	0	0
February	27	10	2.1	8.0	0	0
March	30	13	2.34	10.0	0	0
April	28	3	0.5	4.0	0	0
May	29	6	0.61	4.0	0	0
June	20	1	0.08	2.0	0	0
July	28	1	0.05	2.0	0	0
August	31	2	0.30	4.0	0	0
September	30	3	0.59	6.0	0	0
October	24	2	0.13	2.0	0	0
November	23	5	4.1	100.0	0	0
December	29	18	3.14	10.0	0	0
1928						
January	31	18	2.32	10.0	0	0
February	29	10	1.50	10.0	0	0
March	31	6	0.38	4.0	0	0
April	30	1	0.05	2.0	0	0
May	31	0	0.00	0.0	0	0
June	30	3	0.32	4.0	0	0
July	31	7	1.08	10.0	0	0
August	31	0	0.00	0.0	2	0
September	30	0	0.00	0.0	2	0
October	31	2	0.13	2.0	0	0
November	30	6	1.07	8.0	0	0
December	31	3	0.26	4.0	0	0

TABLE A.—*The observed B. coli quality of the public water supplies of the following designated cities summarized by months for the years indicated; also a record of the reported typhoid fever cases and deaths for the corresponding months*—Continued

STEUBENVILLE, OHIO

Month	Number of sampling days	B. coli index per 100 c. c.			Typhoid fever	
		Days index exceeded 1 per 100 c. c.	Mean monthly index	Maximum of the observed daily indices	Reported cases	Reported deaths
1926						
January	27	15	1.70	6.0	-------	0
February	22	6	0.55	2.0	-------	0
March	27	5	0.59	6.0	-------	0
April	22	1	0.08	2.0	-------	0
May	28	2	0.14	2.0	-------	0
June	28	1	0.07	2.0	-------	0
July	21	7	1.43	8.0	-------	0
August	27	4	0.44	4.0	-------	0
September	22	0	1.09	10.0	-------	0
October	19	2	0.21	2.0	-------	0
November	26	3	0.23	2.0	-------	0
December	26	0	0.00	0.0	-------	0
1927						
January	25	1	0.08	2.0	1	0
February	24	0	0.0	0.0	0	0
March	27	2	0.52	8.0	0	0
April	26	0	0.0	0.0	0	0
May	23	0	0.0	0.0	0	0
June	20	0	0.0	0.0	1	0
July	21	1	0.09	2.0	0	0
August	27	0	0.0	0.0	2	0
September	25	0	0.0	0.0	3	1
October	18	0	0.0	0.0	1	1
November	27	1	0.15	4.0	0	0
December	29	1	0.07	2.0	0	0
1928						
January	23	0	0.0	0.0	0	0
February	25	0	0.0	0.0	0	0
March	28	0	0.0	0.0	0	0
April	22	0	0.0	0.0	0	0
May	28	2	0.50	8.0	0	0
June	29	2	0.14	2.0	1	0
July	31	5	0.71	6.0	0	0
August	31	3	0.39	8.0	2	1
September	22	0	0.0	0.0	1	0
October	24	0	0.0	0.0	0	0
November	16	0	0.0	0.0	0	0
December	26	1	0.15	4.0	1	0

WHEELING, W. VA.

Month	Number of sampling days	Days index exceeded 1 per 100 c. c.	Mean monthly index	Maximum of the observed daily indices	Reported cases	Reported deaths
1926						
January	31	0	0.0	0.0	3	0
February	28	0	0.0	0.0	0	1
March	31	2	0.13	2.0	0	0
April	30	0	0.0	0.0	1	0
May	31	0	0.0	0.0	0	1
June	30	10	40.20	1,000.0	2	0
July	31	0	0.0	0.0	3	0
August	31	0	0.0	0.0	4	0
September	30	20	1.33	2.0	2	0
October	31	1	0.06	2.0	1	0
November	30	0	0.0	0.0	0	0
December	31	0	0.0	0.0	0	0
1927						
January	31	5	0.32	2.0	0	0
February	28	0	0.0	0.0	0	0
March	31	0	0.0	0.0	0	0
April	30	0	0.0	0.0	0	0
May	31	1	0.06	2.0	0	0
June	30	1	0.07	2.0	1	0
July	31	5	0.32	2.0	3	0
August	31	0	0.0	0.0	2	0

Table A.—*The observed B. coli quality of the public water supplies of the following designated cities summarized by months for the years indicated; also a record of the reported typhoid fever cases and deaths for the corresponding months*—Continued

WHEELING, W. VA.—Continued

Month	Number of sampling days	B. coli index p 100 c. c.			Typhoid fever	
		Days index exceeded 1 per 100 c. c.	Mean monthly index	Maximum of the observed daily indices	Reported cases	Repored deaths
1927						
September	30	0	0 0	0.0	0	0
October	31	0	0 0	0 0	1	0
November	30	5	0 33	2.0	0	0
December	31	0	0.0	0 0	1	0
1928						
January	31	0	0.0	0 0	1	0
February	29	0	0.0	0.0	2	0
March	31	0	0.0	0.0	0	0
April	30	0	0.0	0.0	0	0
May	31	0	0.0	0.0	0	0
June	30	7	0.73	4.0	0	0
July	31	0	0.0	0 0	0	0
August	31	1	0.06	2 0	1	0
September	30	0	0.0	0 0	0	0
October	31	0	0.0	0.0	0	0
November	30	6	0.60	4.0	1	0
December	31	7	0.60	4.0	0	0

ASHLAND, KY.

Month	Number of sampling days	Days index exceeded 1 per 100 c. c.	Mean monthly index	Maximum of the observed daily indices	Reported cases	Repored deaths
1926						
January	31	0			1	0
February	28	0			1	0
March	31	0			0	0
April	30	0			0	0
May	31	1	0.06	2.0	0	0
June	30	0			1	0
July	31	0			2	1
August	31	0			2	1
September	30	0			0	0
October	31	0			0	0
November	30	0			0	0
December	31	0			1	0
1927						
January	31	0			0	0
February	28	0			0	0
March	31	0			0	0
April	30	0			0	0
May	31	0			0	0
June	30	0			1	0
July	31	0			9	0
August	31	0			7	1
September	30	0			0	0
October	31	0			1	0
November	30	0			4	0
December	31	0			0	0
1928						
January	31	0			1	0
February	29	0			0	0
March	31	0			0	0
April	30	0			0	0
May	31	0			3	0
June	30	0			4	0
July	31	0			5	0
August	31	0			9	0
September	30	0			5	0
October	31	0			0	0
November	30	0			0	0
December	31	0			0	0

TABLE A.—*The observed B. coli quality of the public water supplies of the following designated cities summarized by months for the years indicated; also a record of the reported typhoid fever cases and deaths for the corresponding months*—Continued

IRONTON, OHIO

Month	Number of sampling days	B. coli index per 100 c. c.: Days index exceeded 1 per 100 c. c.	Mean monthly index	Maximum of the observed daily indices	Typhoid fever: Reported cases	Reported deaths
1926						
January	31	1	0.06	2.0	0	0
February	28	1	0.07	2.0	0	0
March	31	1	0.06	2.0	0	0
April	30	1	0.06	2.0	0	0
May	31	0	0.0	0.0	0	0
June	30	0	0.0	0.0	0	0
July	31	0	0.0	0.0	2	0
August	31	0	0.0	0.0	2	0
September	30	1	0.07	2.0	4	0
October	31	1	0.06	2.0	3	1
November	30	1	0.06	2.0	0	0
December	30	1	0.06	2.0	0	0
1927						
January	31	0	0.0	0.0	0	0
February	28	0	0.0	0.0	0	0
March	31	0	0.0	0.0	0	0
April	30	0	0.0	0.0	0	0
May	31	0	0.0	0.0	2	0
June	30	4	0.27	2.0	0	0
July	31	1	0.06	2.0	1	0
August	31	1	0.06	2.0	3	0
September	30	1	0.07	2.0	0	0
October	31	0	0.0	0.0	0	0
November	30	0	0.0	0.0	0	0
December	31	0	0.0	0.0	0	0
1928						
January	31	1	0.06	2.0	0	0
February	29	1	0.07	2.0	0	0
March	31	0	0.0	0.0	0	0
April	30	0	0.0	0.0	0	0
May	31	0	0.0	0.0	1	0
June	30	1	0.07	2.0	0	0
July	31	4	0.26	2.0	1	0
August	31	2	0.13	2.0	2	0
September	30	7	0.40	2.0	1	0
October	31	2	0.13	2.0	0	0
November	30	1	0.06	2.0	0	0
December	31	2	0.13	2.0	0	0

PORTSMOUTH, OHIO

Month	Number of sampling days	Days index exceeded 1 per 100 c. c.	Mean monthly index	Maximum of the observed daily indices	Reported cases	Reported deaths
1926						
January	31	0	0.00	0.0	1	0
February	28	1	0.07	2.0	0	0
March	31	0	0.00	0.0	0	0
April	30	0	0.00	0.0	1	0
May	31	0	0.00	0.0	3	0
June	30	0	0.00	0.0	1	1
July	30	0	0.00	0.0	3	0
August	31	1	0.07	2.0	4	1
September	14	2	0.14	2.0	1	0
October	31	2	0.13	2.0	0	0
November	30	0	0.00	0.0	1	0
December	30	0	0.00	0.0	0	0
1927						
January	31	0	0.0	0.0	0	0
February	28	0	0.0	0.0	0	0
March	31	0	0.0	0.0	0	0
April	29	0	0.0	0.0	0	0
May	31	0	0.0	0.0	0	0
June	30	0	0.0	0.0	2	0
July	31	1	0.07	2.0	2	0
August	30	1	0.07	2.0	1	0

TABLE A.—*The observed B. coli quality of the public water supplies of the following designated cities summarized by months for the years indicated; also a record of the reported typhoid fever cases and deaths for the corresponding months*—Continued

PORTSMOUTH, OHIO—Continued

Month	Number of sampling days	B. coli index per 100 c. c.: Days index exceeded 1 per 100 c. c.	Mean monthly index	Maximum of the observed daily indices	Typhoid fever: Reported cases	Reported deaths
1927						
September	30	2	0.13	2.0	2	0
October	31	0	0.00	0.0	1	0
November	30	2	0.13	2.0	1	0
December	30	1	0.07	2.0	0	0
1928						
January	31	3	0.19	2.0	0	0
February	29	1	0.07	2.0	0	0
March	31	0	0.00	0.0	0	0
April	30	1	0.07	2.0	0	0
May	31	0	0.00	0.0	3	0
June	30	1	0.07	2.0	1	0
July	31	0	0.00	0.0	3	1
August	31	1	0.07	2.0	3	1
September	30	1	0.06	2.0	7	0
October	31	0	0.00	0.0	4	1
November	30	0	0.00	0.0	4	2
December	30	0	0.00	0.0	1	0

TABLE B.—*The estimated annual populations for the six Ohio River cities included in the present study (estimates based on the 1910, 1920, and 1930 Federal Census)*

Year	Population estimated as of July 1: East Liverpool	Steubenville	Wheeling	Ashland	Ironton	Portsmouth	Combined population
1910	20,410	22,523	41,641	----------	13,165	23,085	121,424
1911	20,518	23,159	41,628	9,442	13,252	24,666	132,665
1912	20,626	23,795	41,614	10,066	13,339	25,648	135,088
1913	20,734	24,431	41,601	10,690	13,426	26,624	137,506
1914	20,842	25,067	41,587	11,314	13,513	27,611	139,934
1915	20,950	25,703	41,574	11,938	13,600	28,592	142,357
1916	21,058	26,339	41,560	12,562	13,687	29,574	144,780
1917	21,166	26,975	41,547	13,186	13,774	30,555	147,203
1918	21,274	27,611	41,533	13,810	13,861	31,537	149,626
1919	21,382	28,247	41,520	14,434	13,948	32,518	152,049
1920	21,490	28,883	56,208	15,058	14,035	33,502	169,176
1921	21,665	29,555	56,784	21,193	14,299	34,438	177,934
1922	21,840	30,227	57,360	22,093	14,565	35,374	181,459
1923	22,015	30,899	57,936	22,993	14,827	36,310	184,980
1924	22,190	31,571	58,512	23,893	15,091	37,246	188,503
1925	22,365	32,243	59,088	24,793	15,355	38,182	192,026
1926	22,540	32,915	59,664	25,693	15,619	39,118	195,549
1927	22,715	33,587	60,240	26,593	15,883	40,054	199,072
1928	22,890	34,259	60,816	27,493	16,147	40,990	202,595

DEATHS DURING WEEK ENDED MAY 30, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended May 30, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended May 30, 1931	Corresponding week, 1930
Policies in force	75,152,855	75,782,122
Number of death claims	13,756	11,132
Death claims per 1,000 policies in force, annual rate	9.5	7.7

Deaths[1] from all causes in certain large cities of the United States during the week ended May 30, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon midyear population estimates derived from the 1930 census]

City	Week ended May 30, 1931				Corresponding week, 1930		Death rate[2] for first 22 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1931	1930
Total (81 cities)	7,652	11.2	605	[4] 46	11.0	681	13.3	13.0
Akron	34	6.9	5	49	5.7	3	8.4	8.4
Albany [5]	42	17.0	4	79	8.2	0	15.2	16.3
Atlanta	97	18.2	5	51	15.4	6	16.3	16.6
White	52		4	63		4		
Colored	45	(6)	1	29	(6)	2	(6)	(6)
Baltimore [5]	200	12.8	8	27	12.7	20	16.3	15.4
White	145		2	9		13		
Colored	55	(6)	6	94	(6)	7	(6)	(6)
Birmingham	73	14.1	7	70	12.4	3	15.0	14.2
White	36		4	69		2		
Colored	37	(6)	3	73	(6)	1	(6)	(6)
Boston	184	12.2	11	31	13.4	20	16.0	16.0
Bridgeport	29	10.3	2	33	9.9	1	12.3	13.0
Buffalo	126	11.3	12	49	11.5	13	14.6	14.4
Cambridge	23	10.5	0	0	6.9	2	13.9	13.5
Camden	23	10.1	3	52	11.0	1	16.6	14.7
Canton	22	10.7	2	46	5.4	2	11.2	11.1
Chicago [5]	686	10.3	39	34	9.3	51	11.6	11.4
Cincinnati	125	14.3	14	84	9.9	8	17.2	16.6
Cleveland	174	9.9	15	44	10.6	17	12.2	12.3
Columbus	82	14.5	4	39	14.8	8	15.0	17.9
Dallas	49	9.4	9		11.5	10	12.3	12.1
White	34		7			6		
Colored	15	(6)	2		(6)	4	(6)	(6)
Dayton	60	15.1	6	84	7.7	3	13.1	10.3
Denver	71	12.7	6	58	14.1	7	15.2	15.4
Des Moines	29	10.5	5	88	11.3	1	11.8	12.6
Detroit	250	7.9	30	48	8.2	32	9.3	10.4
Duluth	20	10.2	0	0	12.8	6	11.5	11.5
El Paso	28	13.9	6		20.8	10	17.5	18.7
Erie	19	8.4	4	75	9.4	3	11.5	11.4
Fall River [5] [7]	41	18.5	5	113	12.2	3	13.6	13.9
Flint	26	8.3	2	26	6.8	4	8.1	10.1
Fort Worth	30	9.3	4		12.4	4	12.3	11.7
White	25		4			2		
Colored	5	(6)	0		(6)	2	(6)	(6)
Grand Rapids	33	10.0	3	44	9.2	3	9.7	11.4
Houston	69	11.6	7		13.4	11	11.6	12.6
White	40		5			7		
Colored	29	(6)	2		(6)	4	(6)	(6)
Indianapolis	87	12.3	6	49	11.3	4	14.8	15.5
White	76		6	56		3		
Colored	11	(6)	0	0	(6)	1	(6)	(6)
Jersey City	59	9.6	9	80	9.2	7	12.9	12.8
Kansas City, Kans	32	13.6	2	41	6.4	1	14.5	12.0
White	21		1	25		1		
Colored	11	(6)	1	127	(6)	0	(6)	(6)
Kansas City, Mo	88	11.2	13	99	11.7	7	14.6	13.9
Knoxville	20	9.5	2	43	14.2	5	13.8	15.2
White	15		2	48		5		
Colored	5	(6)	0	0	(6)	0	(6)	(6)
Long Beach	29	9.9	1	24	10.1	0	10.5	10.4
Los Angeles	273	10.8	25	73	8.6	17	11.5	11.5
Louisville	96	16.2	3	26	10.8	2	15.9	14.3
White	69		1	10		2		
Colored	27	(6)	2	133	(6)	0	(6)	(6)
Lowell [7]	21	10.9	4	102	14.0	1	13.6	14.8
Lynn	19	9.6	0	0	7.1	5	11.4	11.9
Memphis	81	16.3	7	74	16.6	10	17.6	18.1
White	42		1	17		5		
Colored	39	(6)	6	174	(6)	5	(6)	(6)

See footnotes at end of table.

Deaths[1] *from all causes in certain large cities of the United States during the week ended May 30, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*—Continued

City	Week ended May 30, 1931				Corresponding week, 1930		Death rate [2] for first 22 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Miami	19	8.8	1	25	7.0	1	13.7	12.3
White	11		0	0		1		
Colored	8	(6)	1	88	(6)	0	(6)	(6)
Milwaukee	107	9.5	14	61	7.2	7	10.2	10.6
Minneapolis	87	9.6	4	26	8.9	8	11.9	11.2
Nashville	47	15.8	8	119	13.2	4	17.6	16.6
White	27		2	40		2		
Colored	20	(6)	6	354	(6)	2	(6)	(6)
New Bedford [7]	20	9.3	0	0	13.9	5	13.6	12.1
New Haven	39	12.5	5	95	13.8	3	13.2	14.8
New Orleans	127	14.2	7	38	16.4	10	18.3	18.9
White	83		2	17		8		
Colored	44	(6)	5	81	(6)	2	(6)	(6)
New York	1,439	10.6	116	48	10.6	127	12.8	12.1
Bronx Borough	191	7.5	14	32	8.3	8	9.2	8.6
Brooklyn Borough	460	9.1	41	43	9.0	52	11.8	11.1
Manhattan Borough	592	17.0	49	83	16.5	55	19.6	18.0
Queens Borough	147	6.6	10	27	6.8	11	8.2	7.8
Richmond Borough	49	15.6	2	36	11.8	1	14.3	15.0
Newark, N. J	83	9.7	9	47	10.4	7	13.1	13.8
Oakland	53	9.5	3	38	12.8	5	11.4	11.7
Oklahoma City	35	9.3	1	14	10.0	4	12.2	10.2
Omaha	82	19.7	6	67	13.1	4	14.8	14.0
Paterson	28	10.5	1	17	11.7	4	15.0	13.7
Philadelphia	445	11.8	45	65	12.0	43	15.2	13.8
Pittsburgh	143	11.0	11	38	14.4	20	16.8	15.4
Portland, Oreg	70	11.9	4	49	12.7	1	12.6	13.2
Providence	62	12.7	1	9	12.6	4	14.7	15.1
Richmond	47	13.3	3	44	12.5	7	17.1	16.1
White	22		1	22		4		
Colored	25	(6)	2	87	(6)	3	(6)	(6)
Rochester	63	9.9	6	55	8.7	5	13.4	12.7
St. Louis	192	12.1	6	20	13.0	12	16.9	14.7
St. Paul	55	10.4	1	10	9.9	3	11.5	10.9
Salt Lake City [5]	40	14.6	3	45	11.9	4	13.3	13.8
San Antonio	83	18.0	22		23.7	32	16.1	18.5
San Diego	49	16.3	0	0	13.6	1	15.0	15.0
San Francisco	126	10.1	0	0	12.7	7	13.9	13.8
Schenectady	14	7.6	0	0	12.5	1	11.4	12.6
Seattle	82	11.5	3	28	10.2	2	12.6	11.7
Somerville	19	9.4	1	37	7.0	0	10.9	11.7
South Bend	17	8.2	0	0	8.4	3	8.9	9.6
Spokane	32	14.3	2	52	11.7	1	13.0	13.4
Springfield, Mass	33	11.3	0	0	11.1	2	13.8	13.8
Syracuse	51	12.5	4	47	15.6	4	12.7	13.1
Tacoma	25	12.1	1	26	11.7	3	14.0	13.2
Toledo	60	10.6	7	64	9.7	1	12.9	13.8
Trenton	46	19.4	2	35	17.3	8	19.2	17.7
Utica	27	13.8	2	52	11.8	3	15.8	17.0
Washington, D. C	137	14.5	8	44	13.0	5	17.5	16.0
White	83		4	33		2		
Colored	54	(6)	4	69	(6)	3	(6)	(6)
Waterbury	13	6.7	1	30	5.7	0	10.8	10.3
Wilmington, Del. [7]	21	10.3	0	0	16.1	1	15.9	15.6
Worcester	43	11.4	5	69	11.7	4	14.4	14.8
Yonkers	18	6.8	0	0	3.1	0	9.5	8.8
Youngstown	23	6.9	2	28	9.2	4	11.1	11.1

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the resgitration area for births.
[4] Data for 76 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17, Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930, decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended June 6, 1931, and June 7, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 6, 1931, and June 7, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 6, 1931	Week ended June 7, 1930	Week ended June 6, 1931	Week ended June 7, 1930	Week ended June 6, 1931	Week ended June 7, 1930	Week ended June 6, 1931	Week ended June 7, 1930
New England States:								
Maine	4	7	3		34	69	0	2
New Hampshire	1				58	50	1	1
Vermont	1				1	44	0	0
Massachusetts	50	61	2	3	645	1,335	4	2
Rhode Island	9	6			111	38	0	0
Connecticut	6	14	1	8	391	30	1	0
Middle Atlantic States:								
New York	150	118	[1] 8	[1] 8	3,174	2,574	11	8
New Jersey	37	137	20	6	943	1,596	3	6
Pennsylvania	76	72			2,874	776	9	9
East North Central States:								
Ohio	17	33	14	3	857	337	0	3
Indiana	18	15			521	144	2	3
Illinois	124	171	5	61	1,970	629	16	7
Michigan	29	61	4		401	1,347	5	26
Wisconsin	18	17	17	2	788	644	1	3
West North Central States:								
Minnesota	12	6			240	144	4	0
Iowa	6	6			62	166	0	0
Missouri	21	24	2		238	69	4	6
North Dakota	2	3			65	19	1	0
South Dakota	2	2	1		17	62	1	0
Nebraska	9	3			2	125	2	0
Kansas	5	10	1		131	318	1	1
South Atlantic States:								
Delaware		1		1	89	3	0	0
Maryland [2] [3]	18	15	2	5	740	44	3	1
District of Columbia	5	12		2	107	79	1	0
West Virginia	7	6	24	1	198	59	2	1
North Carolina	14	11	8	2	868	54	1	1
South Carolina	13	6	282	114	171		1	1
Georgia	3	2	35	13	111	184	0	2
Florida [3]	1	4	4		101	60	1	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever: 1931, 4 cases; 1 case in Maryland; 1 case in Florida; 1 case in Alabama; and 1 case in Texas.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 6, 1931, and June 7, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 6, 1931	Week ended June 7, 1930	Week ended June 6, 1931	Week ended June 7, 1930	Week ended June 6, 1931	Week ended June 7, 1930	Week ended June 6, 1931	Week ended June 7, 1930
East South Central States:								
Kentucky	8				181	21	2	1
Tennessee	5	3	17	5	366	94	1	7
Alabama [3]	8	8	14	13	104	130	0	4
Mississippi	6	5					5	3
West South Central States:								
Arkansas	2	3	11	1	53	31	0	1
Louisiana	18	8	12	16	8	23	1	4
Oklahoma [4]	10	5	46	15	77	94	0	0
Texas [3]	14	8	31	23	89	183	1	1
Mountain States:								
Montana	1				37	46	2	1
Idaho	3	1			4	21	0	1
Wyoming	5	1			3	54	0	0
Colorado	10	8			474	503	2	0
New Mexico	10	11		1	51	62	0	1
Arizona			2	3	38	66	1	7
Utah [2]	1		1	6	4	212	1	3
Pacific States:								
Washington	4	3			132	727	0	1
Oregon	6	5	6	8	64	105	0	1
California	58	58	36	20	935	1,934	1	7

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 6, 1931	Week ended June 7, 1930	Week ended June 6, 1931	Week ended June 7, 1930	Week ended June 6, 1931	Week ended June 7, 1930	Week ended June 6, 1931	Week ended June 7, 1930
New England States:								
Maine	0	0	38	8	0	0	0	1
New Hampshire	0	0	0	13	0	0	0	0
Vermont	0	0	3	5	4	1	0	0
Massachusetts	3	0	264	218	0	0	3	8
Rhode Island	0	0	34	19	0	0	0	0
Connecticut	1	0	37	48	0	0	2	2
Middle Atlantic States:								
New York	1	0	746	402	5	3	14	20
New Jersey	1	1	279	202	0	0	5	6
Pennsylvania	1	2	518	210	0	0	8	10
East North Central States:								
Ohio	0	1	308	157	17	74	9	7
Indiana	0	0	155	88	121	96	2	19
Illinois	0	1	473	391	29	119	8	15
Michigan	1	0	395	273	17	39	4	2
Wisconsin	0	1	104	84	6	6	0	5
West North Central States:								
Minnesota	0	0	58	60	11	4	3	2
Iowa	1	0	48	37	64	97	3	3
Missouri	1	0	150	103	51	89	8	3
North Dakota	0	0	19	8	16	27	1	0
South Dakota	0	0	8	5	19	41	0	0
Nebraska	0	0	31	29	30	53	0	1
Kansas	1	0	23	48	57	53	2	5
South Atlantic States:								
Delaware	0	0	9	5	0	0	0	1
Maryland [2] [3]	0	0	51	71	0	0	6	5
District of Columbia	0	0	16	4	0	0	0	3
West Virginia	1	0	19	15	7	29	5	10
North Carolina	0	5	15	16	4	7	17	16
South Carolina	1	2	0	4	7	4	19	45
Georgia	1	0	41	19	0	0	19	18
Florida [3]	0	0	4	1	0	0	1	1

[2] Week ended Friday.
[3] Typhus fever: 1931, 4 cases; 1 case in Maryland; 1 case in Florida; 1 case in Alabama; and 1 case in Texas.
[4] Exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 6, 1931, and June 7, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 6, 1931	Week ended June 7, 1930	Week ended June 6, 1931	Week ended June 7, 1930	Week ended June 6, 1931	Week ended June 7, 1930	Week ended June 6, 1931	Week ended June 7, 1930
East South Central States:								
Kentucky	0	0	55	27	5	20	6	5
Tennessee	0	0	12	41	25	25	6	14
Alabama	1	2	11	8	28	7	11	8
Mississippi	0	1	9	4	37	4	17	24
West South Central States:								
Arkansas	0	1	13	2	31	2	9	12
Louisiana	0	0	8	19	27	26	12	30
Oklahoma [4]	0	0	15	27	81	80	3	9
Texas [3]	0	1	28	18	79	37	10	12
Mountain States:								
Montana	0	0	25	28	0	7	3	2
Idaho	0	0	6	2	2	3	0	0
Wyoming	0	0	10	1	0	14	0	0
Colorado	0	0	20	10	22	7	4	0
New Mexico	0	1	5	8	0	9	0	0
Arizona	0	0	0	6	2	6	3	4
Utah [1]	2	0	2	8	0	1	0	0
Pacific States:								
Washington	0	1	26	15	21	64	5	1
Oregon	0	1	19	14	23	18	4	2
California	9	31	97	114	24	46	10	12

[1] Week ended Friday.
[3] Typhus fever: 1931, 4 cases; 1 case in Maryland, 1 case in Florida; 1 case in Alabama; and 1 case in Texas.
[4] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
March, 1931										
Delaware		11	46		388		0	101	0	1
April, 1931										
Delaware		7	3		1,036		0	158	0	1
Florida	10	28	123	13	1,040	3	1	23	4	16
May, 1931										
Arizona	3	13	12		215	2	1	11	0	10
Connecticut	5	39	14	1	2,414		1	200	0	9
Delaware	1	2			539		0	64	0	3
District of Columbia	7	37	10		1,222	1	0	76	0	3
Florida	2	19	10	9	764	12	1	20	5	12
Porto Rico		32	378	1,487	27	6	1		0	14
Wyoming			1		6		0	45	2	

March, 1931	Cases
Delaware:	
Chicken pox	21
Mumps	101
Rabies in animals	2
Undulant fever	1
Whooping cough	9

April, 1931	
Chicken pox.	
Delaware	25
Florida	273
Dysentery:	
Florida	2
Mumps:	
Delaware	122
Florida	42
Rabies in animals:	
Delaware	8
Florida	1
Whooping cough:	
Delaware	8
Florida	121

May, 1931	Cases
Chicken pox:	
Arizona	26
Connecticut	392
Delaware	18
District of Columbia	86
Florida	161
Porto Rico	10
Wyoming	35
Colibacillosis:	
Porto Rico	1
Conjunctivitis:	
Connecticut	10
Wyoming	1
Dengue.	
Porto Rico	1
Dysentery:	
Arizona	16
Florida	5
Porto Rico	29
Filariasis:	
Porto Rico	2
German measles:	
Connecticut	41
Lead poisoning:	
Connecticut	1
Lethargic encephalitis:	
Connecticut	3
Mumps:	
Arizona	15
Connecticut	276
Delaware	34
Florida	43
Porto Rico	1
Wyoming	72
Ophthalmia neonatorum:	
Porto Rico	7
Paratyphoid fever:	
Porto Rico	2
Puerperal septicemia:	
Porto Rico	6
Rabies in animals:	
Connecticut	5
Delaware	4
Rocky Mountain spotted or tick fever:	
Wyoming	8
Septic sore throat:	
Connecticut	10
Wyoming	1
Tetanus:	
Connecticut	1
Porto Rico	5
Tetanus (infantile):	
Porto Rico	24
Trachoma:	
Arizona	10
Porto Rico	1
Trichinosis	
Connecticut	7
Undulant fever:	
Connecticut	2
Whooping cough:	
Arizona	32
Connecticut	172
Delaware	13
District of Columbia	35
Florida	71
Porto Rico	316
Wyoming	32

PLAGUE-INFECTED GROUND SQUIRRELS IN CALIFORNIA

The director of public health of California reported, under date of May 25, 1931, that plague had been proved by animal inoculation in four ground squirrels from a ranch 21 miles southeast of King City, Monterey County, Calif.

On June 2, 1931, he reported that plague infection had been proved in two ground squirrels from a ranch 6 miles east of San Lucas, Monterey County.

The last previous plague-infected ground squirrel in California was reported in December, 1929, from Santa Clara County.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 97 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,370,000. The estimated population of the 90 cities reporting deaths is more than 31,825,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemic.

Weeks ended May 30, 1931, and May 31, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	765	927	
97 cities	378	476	736
Measles:			
43 States	18,655	14,229	
97 cities	7,142	5,747	
Meningococcus meningitis:			
46 States	99	131	
97 cities	51	55	
Poliomyelitis:			
46 States	23	41	
Scarlet fever:			
46 States	4,571	2,696	
97 cities	1,957	1,140	1,186
Smallpox:			
46 States	776	750	
97 cities	94	96	49
Typhoid fever:			
46 States	208	226	
97 cities	43	44	40
Deaths reported			
Influenza and pneumonia:			
90 cities	658	495	
Smallpox:			
90 cities	1	0	
Fort Worth, Tex	1	0	

City reports for week ended May 30, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	4	1	0		0	0	9	2
New Hampshire.								
Concord	0	0	0		0	13	0	1
Vermont:								
Barre	0	0	0		0	0	0	0
Massachusetts:								
Boston	49	31	10		0	62	12	20
Fall River	3	2	0	1	1	20	6	7
Springfield	10	2	0	1	1	12	11	0
Worcester	11	2	6		0	3	23	8
Rhode Island:								
Pawtucket	0	1	1		0	0	0	0
Providence	7	5	3		0	97	20	4
Connecticut:								
Bridgeport	2	4	1	1	1	2	8	3
Hartford	5	4	0	1	1	2	1	4
New Haven	45	1	0		0	178	10	2
MIDDLE ATLANTIC								
New York:								
Buffalo	14	9	6		0	282	36	11
New York	262	241	100	9	4	1,419	64	145
Rochester	8	5	0		0	123	14	3
Syracuse	32	3	0		0	10	1	1
New Jersey:								
Camden	1	6	1		0	1	0	5
Newark	106	13	4	2	0	21	6	9
Trenton	3	2	1		0	4	3	1
Pennsylvania:								
Philadelphia	148	56	7	4	0	713	31	34
Pittsburgh	33	15	11	1	2	78	60	30
Reading	11	1	0		0	5	6	4
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	8	5	1		0	106	22	12
Cleveland	203	22	10	2	0	325	378	14
Columbus	33	3	1	1	1	17	3	5
Toledo	39	3	5	1	1	7	17	4
Indiana.								
Fort Wayne	6	1	1		0	9	0	4
Indianapolis	42	2	5		0	367	47	13
South Bend		0						
Terre Haute	1	0	1		0	14	0	0
Illinois:								
Chicago	165	81	81	3	5	760	69	44
Springfield	15	0	0		0	22	7	3
Michigan:								
Detroit	127	40	30	4	2	21	61	18
Flint	51	2	3		0	4	9	2
Grand Rapids	4	0	0		0	43	0	4

City reports for week ended May 30, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—con.								
Wisconsin:								
Kenosha	0	0	0		0	1	162	0
Madison	6	0	1			2	40	
Milwaukee	112	11	1	1	1	440	454	4
Racine	7	0	0		0	4	25	0
Superior	3	0	0		0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	10	0	0		0	0	5	3
Minneapolis	149	11	7		1	96	133	6
St Paul	90	7	0	1	1	60	3	2
Iowa:								
Davenport	0	0	0			0	0	
Des Moines	0	1	0			0	0	
Sioux City	15	1	3			3	24	
Waterloo	1	0	0			1	0	
Missouri:								
Kansas City	11	3	1		1	153	6	14
St. Joseph	1	0	7		0	4	2	1
St. Louis	34	30	9	1		7	17	6
North Dakota.								
Fargo	1	0	0		0	4	7	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	3	0	0			13	0	
Nebraska:								
Omaha	38	2	1		0	0	27	11
Kansas.								
Topeka	9	1	0	1	0	1	44	1
Wichita	9	1	0		0	6	1	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	0	2		0	17	1	1
Maryland:								
Baltimore	66	20	6	1	2	487	53	21
Cumberland	2	0	0		0	2	0	1
Frederick	1	0	0		0	12	0	0
District of Columbia.								
Washington	20	10	9		0	202	0	7
Virginia:								
Lynchburg	20	1	0		0	2	0	0
Norfolk	1	0	0		0	70	0	1
Richmond	0	1	1		3	89	0	3
Roanoke	7	1	0		0	12	4	1
West Virginia:								
Charleston	2	0	0		0	0	0	2
Wheeling	7	0	0		0	2	0	2
North Carolina:								
Raleigh	1	0	0		0	70	0	1
Wilmington	1	0	0		0	1	0	3
Winston-Salem	1	0	0		0	109	15	3
South Carolina:								
Charleston	0	0	0	18	0	2	0	4
Columbia	0	0	0		0	1	0	6
Greenville	0	0	0		0	0	0	0
Georgia:								
Atlanta	8	2	2	6	2	26	5	8
Brunswick	0	0	0		0	0	8	0
Savannah	2	0	1	6	2	1	5	3
Florida:								
Miami	1	2	2	1	0	101	1	8
Tampa	1	1	0		0	23	0	1

City reports for week ended May 30, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0	...	0	1	1	2
Tennessee:								
Memphis	16	0	2	...	1	120	2	10
Nashville	1	0	0	...	0	55	0	6
Alabama:								
Birmingham	2	1	0	4	2	3	1	8
Mobile	0	0	1	...	0	0	0	3
Montgomery	0	0	0	...	...	1	1	...
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	3	0	0	...	...	1	0	...
Little Rock	2	0	0	...	1	15	3	3
Louisiana:								
New Orleans	6	7	13	1	1	2	0	9
Shreveport	4	0	0	...	0	7	4	2
Oklahoma:								
Muskogee	12	0	0	...	0	1	2	0
Oklahoma City	1	1	0	4	0	3	0	7
Tulsa	5	0	0	...	...	9	1	...
Texas:								
Dallas	43	3	1	...	1	14	10	3
Forth Worth	25	1	1	...	0	2	0	4
Galveston	0	0	0	...	0	0	0	3
Houston	0	3	1	...	0	11	3	4
San Antonio	1	1	1	...	1	37	1	13
MOUNTAIN								
Montana:								
Billings	5	0	0	...	0	3	0	0
Great Falls	2	0	1	...	0	1	0	0
Helena	0	0	0	...	0	1	0	0
Missoula	7	0	0	...	0	0	0	1
Idaho:								
Boise	1	0	0	...	0	0	0	0
Colorado:								
Denver	24	8	5	...	2	33	22	5
Pueblo	0	1	0	...	0	12	0	0
New Mexico:								
Albuquerque	6	0	0	...	0	4	0	0
Arizona:								
Phoenix	0	0	0	...	0	2	0	0
Utah:								
Salt Lake City	19	2	0	...	0	1	6	1
Nevada:								
Reno	0	0	0	...	0	2	0	1
PACIFIC								
Washington:								
Seattle	61	2	0	...	...	11	15	...
Spokane	8	2	0	...	...	1	0	...
Tacoma	6	1	0	...	0	0	5	1
Oregon:								
Portland	9	4	0	...	1	17	11	2
Salem	10	0	0	...	0	3	16	0
California:								
Los Angeles	39	28	13	20	2	92	8	9
Sacramento	5	2	0	...	0	45	4	3
San Francisco	37	13	6	4	0	102	7	5

City reports for week ended May 30, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	13	3	0	0	0	0	0	0	0	2	20
New Hampshire:											
Concord	1	0	0	0	0	1	0	0	0	0	11
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	2
Massachusetts:											
Boston	67	80	0	0	0	9	2	1	0	20	184
Fall River	3	3	0	0	0	2	0	0	0	6	41
Springfield	7	17	0	0	0	2	0	0	0	6	31
Worcester	8	17	0	0	0	2	0	0	0	6	43
Rhode Island:											
Pawtucket	3	0	0	0	0	0	0	0	0	0	18
Providence	10	24	0	0	0	2	0	0	0	5	62
Connecticut:											
Bridgeport	8	0	0	0	0	1	0	0	0	0	29
Hartford	4	2	0	0	0	2	1	0	0	1	34
New Haven	5	0	0	0	0	3	0	0	0	3	39
MIDDLE ATLANTIC											
New York:											
Buffalo	23	33	0	2	0	11	0	0	0	20	123
New York	249	313	0	0	0	114	9	18	2	128	1,439
Rochester	9	44	0	0	0	1	1	0	0	5	58
Syracuse	8	20	0	0	0	1	0	0	0	11	51
New Jersey:											
Camden	5	3	0	0	0	1	1	0	0	5	23
Newark	24	38	0	0	0	7	0	0	0	61	86
Trenton	3	4	0	0	0	2	0	1	0	0	46
Pennsylvania:											
Philadelphia	87	164	0	0	0	34	2	0	0	38	445
Pittsburgh	27	62	0	0	0	8	0	0	0	24	143
Reading	4	0	0	0	0	4	0	0	0	0	21
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	14	55	2	1	0	14	0	0	0	4	125
Cleveland	38	93	0	1	0	15	1	0	1	41	174
Columbus [1]	7	8	0	0	0	7	0	1	0	1	82
Toledo	11	10	1	0	0	6	0	0	0	15	60
Indiana:											
Fort Wayne	3	5	2	0	0	4	0	0	0	1	38
Indianapolis	13	40	7	9	0	3	0	0	0	51	-------
South Bend	4	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Terre Haute	2	4	1	1	0	0	0	0	0	3	17
Illinois:											
Chicago	108	261	2	0	0	55	3	1	1	58	686
Springfield	3	1	0	0	0	0	0	0	0	0	34
Michigan:											
Detroit	106	177	1	0	0	18	1	1	0	99	250
Flint	11	20	1	1	0	4	0	0	0	16	26
Grand Rapids	9	9	0	0	0	2	0	0	0	17	33
Wisconsin:											
Kenosha	2	14	0	0	0	0	0	0	0	4	4
Madison	1	1	0	1	-------	-------	0	0	-------	2	-------
Milwaukee	29	20	0	0	0	9	1	0	0	27	107
Racine	3	4	0	0	0	2	0	0	0	21	17
Superior	2	5	0	0	0	0	0	0	0	0	7
WEST NORTH CENTRAL											
Minnesota:											
Duluth	7	0	0	0	0	0	0	0	0	0	20
Minneapolis	29	13	0	1	0	0	0	0	0	19	87
St. Paul	19	12	0	1	0	4	0	0	0	23	64

[1] The report of 3 deaths from typhoid fever at Columbus during the week ended May 9, 1931, was erroneous, no deaths having occurred.

City reports for week ended May 30, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—continued											
Iowa:											
Davenport	1	2	1	10			0	0		4	
Des Moines	7	7	2	12			0	0		0	29
Sioux City	1	8	0	5			0	0		12	
Waterloo	2	6	0	0			0	0		5	
Missouri:											
Kansas City	13	4	1	2	0	4	1	1	0	8	88
St. Joseph	2	6	0	1	0	0	0	0	0	0	22
St. Louis	27	91	2	5	0	19	1	0	0	27	192
North Dakota:											
Fargo	1	2	0	0	0	0	0	0	0	3	
Grand Forks	1	0	0	0			0	1		0	
South Dakota:											
Aberdeen	1	0	0	1			0	0		0	
Nebraska:											
Omaha	3	9	3	17	0	3	0	1	0	7	67
Kansas:											
Topeka	3	0	0	4	0	1	0	0	0	3	19
Wichita	3	1	0	10	0	1	0	0	0	6	27
SOUTH ATLANTIC											
Delaware:											
Wilmington	3	4	0	0	0	1	0	0	0	5	21
Maryland:											
Baltimore	35	29	0	0	0	18	2	2	0	37	200
Cumberland	0	0	0	0	0	0	0	1	0	0	4
Frederick	0	0	0	0	0	0	0	0	0	0	5
District of Col.:											
Washington	20	25	0	0	0	14	0	0	0	11	137
Virginia:											
Lynchburg	0	0	0	0	0	1	0	1	0	0	12
Norfolk	1	0	0	0	0	2	1	0	0	5	
Richmond	2	9	0	0	0	7	0	0	0	0	53
Roanoke	0	0	0	0	0	0	0	0	0	6	13
West Virginia:											
Charleston	0	0	0	0	0	2	1	0	0	1	26
Wheeling	1	2	0	0	0	0	0	0	0	1	16
North Carolina:											
Raleigh	0	0	0	0	0	1	0	1	0	27	14
Wilmington	0	0	0	0	0	2	0	0	0	17	11
Winston-Salem	0	1	1	0	0	3	0	0	0	12	24
South Carolina:											
Charleston	0	0	1	0	0	1	1	2	0	0	27
Columbia	0	0	0	0	0	0	1	0	0	0	32
Greenville	0	0	0	0	0	0	0	0	0	2	
Georgia:											
Atlanta	3	51	2	12	0	5	1	2	2	9	97
Brunswick	0	0	0	0	0	1	0	0	0	0	3
Savannah	0	0	0	0	0	2	0	2	0	1	42
Florida:											
Miami	0	0	0	0	0	2	0	0	0	2	19
Tampa	1	0	0	0	0	0	0	0	0	1	17
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	9	1	0	0	1	0	0	0	1	17
Tennessee:											
Memphis	4	27	0	0	0	4	2	2	0	36	81
Nashville	2	7	2	0	0	0	1	0	0	6	47
Alabama:											
Birmingham	1	6	2	0	0	7	1	0	0	7	73
Mobile	0	0	0	1	0	1	0	0	0	0	22
Montgomery	1	2	0	0			0	0		1	

City reports for week ended May 30, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0			0	0		0	
Little Rock	1	1	0	0	0	2	0	0	0	0	6
Louisiana:											
New Orleans	7	8	0	7	0	7	2	0	0	2	127
Shreveport	1	0	0	0	0	5	0	0	0	4	40
Oklahoma:											
Muskogee	0	0	2	0	0	0	0	0	0	1	
Oklahoma City	3	0	2	0	0	3	1	0	0	0	35
Tulsa	1	0	1	24			0	0		2	
Texas:											
Dallas	2	1	1	3	0	1	1	0	0	10	49
Fort Worth	2	2	2	7	1	1	0	0	0	15	30
Galveston	0	0	0	1	0	0	0	0	0	0	14
Houston	2	4	1	0	0	8	0	1	0	0	69
San Antonio	0	1	0	0	0	4	0	1	0	0	83
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	2	4
Great Falls	1	4	0	0	0	0	0	1	0	16	5
Helena	0	0	0	0	0	0	0	0	0	0	2
Missoula	0	0	0	0	0	0	0	0	0	0	7
Idaho:											
Boise	0	0	0	3	0	0	0	0	0	2	2
Colorado:											
Denver	11	12	0	0	0	5	0	0	0	26	78
Pueblo	0	0	0	0	0	1	1	1	0	6	3
New Mexico:											
Albuquerque	1	0	0	0	0	3	0	0	0	0	8
Arizona:											
Phoenix	0	0	1	0	0	0	0	0	0	0	
Utah:											
Salt Lake City	2	3	1	0	0	1	0	0	0	28	40
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	4
PACIFIC											
Washington:											
Seattle	7	11	1	0			0	1		55	
Spokane	5	0	5	6			0	0		2	
Tacoma	3	1	3	0	0	2	0	0	0	8	25
Oregon:											
Portland	3	1	9	5	0	0	0	0	0	3	70
Salem	0	1	0	0	0	0	0	0	0	0	
California:											
Los Angeles	28	36	5	0	0	18	1	0	0	34	
Sacramento	2	2	1	0	0	2	1	0	0	12	19
San Francisco	20	6	0	0	0	7	0	0	0	18	124

City reports for week ended May 30, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
NEW ENGLAND									
Massachusetts:									
Boston	0	0	0	0	0	0	1	1	0
MIDDLE ATLANTIC									
New York:									
New York	4	0	3	0	0	0	1	2	0
Syracuse	2	0	0	0	0	0	0	0	0
New Jersey:									
Newark	3	1	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	2	1	0	0	0	0	0	0	0
Pittsburgh	1	1	0	0	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	1	0	0	0	0	0	0	0
Cleveland	1	2	1	0	0	0	0	1	0
Columbus	1	1	1	1	0	0	0	0	0
Indiana:									
Indianapolis	2	1	0	0	0	0	0	0	0
Illinois: [1]									
Chicago	9	4	0	0	0	0	0	0	0
Michigan:									
Detroit	2	0	0	0	0	0	0	0	0
Grand Rapids	1	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	1	0	0	0	0	0	0	0	0
St. Paul	0	0	0	0	0	0	0	2	0
Iowa:									
Waterloo	0	0	0	0	0	0	0	1	0
Missouri:									
St. Louis	3	2	0	0	0	0	0	0	0
Nebraska:									
Omaha	2	0	0	0	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	3	0	0	0	0	0	0	0	0
District of Columbia:									
Washington	2	1	0	0	0	0	0	0	0
Virginia:									
Roanoke	0	0	0	0	0	1	0	0	0
West Virginia:									
Charleston	1	1	0	0	0	0	0	0	0
Wheeling	0	0	0	0	0	0	0	1	0
North Carolina:									
Wilmington	0	0	0	0	1	0	0	0	0
Winston-Salem	0	0	0	0	1	0	0	0	0
South Carolina:									
Charleston	1	1	0	0	5	1	0	0	0
Columbia	3	0	0	0	0	0	0	0	0
Georgia:									
Atlanta	0	0	1	1	0	0	0	0	0
Brunswick	0	0	0	0	1	0	0	0	0
Savannah	0	0	0	0	1	1	0	0	0
Florida:									
Tampa	0	1	0	0	0	1	0	0	0

[1] Rabies (in man); 1 death at Springfield, Ill.

City reports for week ended May 30, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	0	0	0	0	0	2	0	0	0
Nashville	1	0	0	0	0	0	0	0	0
Alabama:									
Birmingham	0	0	0	0	1	2	0	0	0
Mobile	0	0	0	0	3	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	1	1	0	0	0	0	0	0	0
Oklahoma:									
Oklahoma City	1	0	0	0	0	0	0	0	0
Texas:									
Dallas	1	0	0	0	2	1	0	0	0
MOUNTAIN									
Montana:									
Great Falls	0	1	0	0	0	0	0	0	0
Colorado:									
Pueblo	1	0	0	0	0	0	0	0	0
New Mexico:									
Albuquerque	0	0	0	0	1	1	0	0	0
Utah:									
Salt Lake City	2	0	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Tacoma	1	1	0	0	0	0	0	0	0
California:									
Los Angeles	0	0	0	0	0	1	0	0	0

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended May 30, 1931, compared with those for a like period ended May 31, 1930. The population figures used in computing the rates are estimated midyear populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, April 26 to May 30, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended–									
	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930	May 30, 1931	May 31, 1930
98 cities	63	83	[2] 67	77	63	74	62	79	[3] 59	76
New England	36	82	[4] 35	65	38	106	48	68	50	56
Middle Atlantic	61	72	61	85	58	74	63	76	58	67
East North Central	84	130	82	103	72	91	67	115	[3] 82	110
West North Central	57	68	71	45	71	74	75	72	54	77
South Atlantic	69	50	63	62	55	54	38	54	41	60
East South Central	6	0	41	6	17	36	12	24	17	36
West South Central	68	94	108	73	81	66	81	52	54	49
Mountain	26	44	[5] 28	70	61	35	61	53	52	44
Pacific	53	61	61	49	74	43	72	59	37	67

MEASLES CASE RATES

	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930	May 30, 1931	May 31, 1930
98 cities	1,250	1,293	[2] 1,308	1,411	1,403	1,255	1,372	1,159	[3] 1,116	911
New England	964	1,942	[4] 1,103	2,303	1,166	1,843	1,190	1,877	935	1,558
Middle Atlantic	1,411	1,284	1,433	1,295	1,486	1,337	1,478	1,091	1,187	940
East North Central	897	1,005	1,102	927	1,313	814	1,458	685	[3] 1,312	524
West North Central	777	1,003	1,016	1,269	1,396	831	1,098	794	641	525
South Atlantic	3,871	1,188	3,553	1,298	3,365	1,228	2,840	957	2,089	793
East South Central	1,426	185	1,263	442	1,234	359	1,234	568	1,047	335
West South Central	156	731	152	711	166	735	271	547	294	453
Mountain	661	5,912	[5] 576	9,128	531	6,652	618	7,119	461	5,674
Pacific	505	1,773	501	1,992	554	1,670	456	2,180	492	1,397

SCARLET FEVER CASE RATES

	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930	May 30, 1931	May 31, 1930
98 cities	368	296	[2] 390	258	38[illegible]	22[illegible]	367	206	[3] 30[illegible]	182
New England	582	268	[4] 631	310	66[illegible]	261	536	314	351	307
Middle Atlantic	409	285	448	266	439	222	442	204	304	162
East North Central	402	394	439	318	454	308	412	227	[3] 440	264
West North Central	480	384	440	238	383	262	340	306	291	213
South Atlantic	273	294	276	242	243	172	241	164	239	126
East South Central	407	132	250	138	337	24	390	102	297	72
West South Central	132	115	105	94	108	73	85	49	51	14
Mountain	191	361	[5] 177	370	157	229	270	300	165	97
Pacific	94	109	106	130	123	128	88	97	110	71

SMALLPOX CASE RATES

	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930	May 30, 1931	May 31, 1930
98 cities	27	27	[2] 15	24	17	22	16	20	[3] 15	15
New England	0	0	[4] 0	2	0	0	0	0	0	0
Middle Atlantic	1	1	3	0	1	0	4	0	1	1
East North Central	10	21	6	22	23	16	15	10	[3] 8	12
West North Central	125	132	78	101	75	126	67	110	88	56
South Atlantic	6	0	8	0	6	4	6	2	24	10
East South Central	58	36	41	6	12	72	41	30	6	30
West South Central	101	31	64	38	41	21	47	10	37	14
Mountain	0	150	[5] 0	79	17	62	9	70	26	62
Pacific	51	73	12	83	25	47	12	71	12	49

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931, and 1930, respectively.
[2] Pawtucket, R. I., Billings, Mont., and Boise, Idaho, not included.
[3] South Bend, Ind., not included.
[4] Pawtucket, R. I., not included.
[5] Billings, Mont., and Boise, Idaho, not included.

Summary of weekly reports from cities, April 26 to May 30, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930— Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930	May 30, 1931	May 31, 1930
98 cities	6	6	[2] 5	6	5	8	6	7	[3] 7	7
New England	7	2	[4] 5	0	5	10	2	19	2	12
Middle Atlantic	7	3	5	4	5	7	5	4	8	3
East North Central	4	6	2	2	2	2	5	5	[3] 2	2
West North Central	4	4	2	8	6	8	10	8	4	10
South Atlantic	14	6	8	16	12	14	12	12	22	14
East South Central	12	24	6	18	17	42	17	24	12	36
West South Central	0	21	7	3	7	35	7	10	7	21
Mountain	0	53	[5] 0	18	0	0	0	0	17	9
Pacific	6	6	8	20	0	2	8	6	2	8

INFLUENZA DEATH RATES

	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930	May 30, 1931	May 31, 1930
91 cities	11	9	[2] 12	9	8	8	7	6	[3] 7	4
New England	7	5	[4] 5	10	2	0	5	5	10	0
Middle Atlantic	12	9	11	10	7	7	5	7	3	4
East North Central	5	7	11	9	5	4	5	5	[3] 6	4
West North Central	12	9	6	3	9	3	3	0	9	3
South Atlantic	20	16	22	6	16	20	4	6	18	4
East South Central	19	19	50	13	50	39	19	19	19	32
West South Central	38	21	14	28	7	4	28	7	14	4
Mountain	26	0	[5] 28	0	9	9	26	9	17	18
Pacific	2	5	7	7	7	12	0	5	5	2

PNEUMONIA DEATH RATES

	May 2, 1931	May 3, 1930	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930	May 30, 1931	May 31, 1930
91 cities	121	135	[2] 117	133	102	102	95	101	[3] 101	78
New England	154	164	[4] 135	131	113	111	72	109	111	97
Middle Atlantic	141	163	144	176	121	124	121	130	109	89
East North Central	77	107	87	92	74	67	68	79	[3] 76	53
West North Central	180	114	121	126	103	108	97	84	133	69
South Atlantic	180	204	130	132	126	170	111	110	132	90
East South Central	120	123	120	142	126	84	120	78	183	97
West South Central	152	110	114	164	114	78	97	82	128	121
Mountain	61	62	[5] 102	123	78	79	70	123	70	79
Pacific	46	42	70	52	55	47	55	35	43	52

[2] Pawtucket, R. I., Billings, Mont., and Boise, Idaho, not included.
[3] South Bend, Ind., not included.
[4] Pawtucket, R. I., not included.
[5] Billings, Mont., and Boise, Idaho, not included.

57617°—31——4

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended May 23, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended May 23, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia [1]					
New Brunswick					2
Quebec	2		1		6
Ontario	1	1	1		2
Manitoba					3
Saskatchewan	1	6		18	
Alberta			1		1
British Columbia		8			2
Total	4	15	3	18	16

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended May 30, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended May 30, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	94	Mumps	10
Diphtheria	14	Scarlet fever	60
Erysipelas	5	Tuberculosis	105
German measles	4	Typhoid fever	2
Measles	469	Whooping cough	11

CUBA

Habana—Communicable diseases—Four weeks ended May 23, 1931.—During the four weeks ended May 23, 1931, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	43		Measles	86	1
Diphtheria	20	2	Scarlet fever	11	
Leprosy	3		Tuberculosis	26	1
Malaria [1]	5		Typhoid fever [1]	15	4

[1] Many of these cases are from the Island of Cuba, outside of Habana.

DENMARK

Communicable diseases—March, 1931.—During the month of March, 1931, cases of certain communicable diseases were reported in Denmark, as follows:

Disease	Cases	Disease	Cases
Anthrax	2	Paratyphoid fever	5
Cerebrospinal meningitis	2	Puerperal fever	21
Chicken pox	37	Scabies	812
Diphtheria and croup	349	Scarlet fever	192
Erysipelas	243	Syphilis	146
German measles	3	Tetanus	1
Influenza	22,829	Typhoid fever	4
Lethargic encephalitis	7	Undulant fever (Bac. abort. Bang)	58
Measles	1,241	Whooping cough	1,554
Mumps	519		

GREAT BRITAIN

England and Wales—Vital statistics—January-March, 1931.—During the first quarter of the year 1931, 159,820 births and 162,198 deaths were registered in England and Wales, giving a birth rate on an annual basis of 16.3 per 1,000 population and a death rate of 16.5 per 1,000. The figures are provisional. The mortality of infants under 1 year of age was 94 per 1,000 live births.

During the 13 weeks ended April 4, 1931, deaths from certain communicable diseases were reported in 107 county boroughs and great towns, including Greater London, as follows:

Disease	Number of deaths	Death rate per 1,000 population	Disease	Number of deaths	Death rate per 1,000 population
Diarrhea and enteritis (under 2 years)	789		Scarlet fever	92	0.02
Diphtheria	508	0.10	Smallpox	1	
Influenza	4,403	.90	Typhoid fever	24	
Measles	984	.20	Whooping cough	574	.12

Deaths from certain communicable diseases in 159 smaller towns for the quarter ended March 31, 1931, were as follows:

Disease	Deaths	Disease	Deaths
Diarrhea and enteritis (under 2 years)	99	Scarlet fever	25
Diphtheria	107	Typhoid fever	6
Influenza	1,261	Whooping cough	110
Measles	161		

England and Wales—Communicable diseases—Thirteen weeks ended April 4, 1931.—During the 13 weeks ended April 4, 1931, cases of certain communicable diseases were reported in England and Wales as follows:

Disease	Cases	Diseases	Cases
Diphtheria	15,488	Puerperal pyrexia	1,626
Ophthalmia neonatorum	1,223	Scarlet fever	21,088
Pneumonia	28,000	Smallpox	2,921
Puerperal fever	662	Typhoid fever	607

JAMAICA

Communicable diseases—Four weeks ended May 23, 1931.—During the four weeks ended May 23, 1931, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island of Jamaica, outside of Kingston as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis		3	Leprosy		3
Chicken pox	1	52	Puerperal fever		4
Diphtheria		1	Scarlet fever	4	10
Dysentery		2	Tuberculosis	35	80
Erysipelas		2	Typhoid fever	6	38

TRINIDAD

Port of Spain—Vital statistics—April 1930, 1931.—The following statistics for the month of April, 1930 and 1931, are taken from a report issued by the public health department of Port of Spain, Trinidad:

	April			April	
	1930	1931		1930	1931
Number of births	171	170	Death rate per 1,000 population	19.7	19.3
Birth rate per 1,000 population	30.9	30.1	Deaths under 1 year	12	19
Number of deaths	109	109	Deaths under 1 year per 1,000 births	70.2	111.8

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931			April, 1931				May, 1931					June 6, 1931
						14	21	28	4	11	18	25	2	9	16	23	30	
Ceylon: Colombo	C					1											1	
China: Canton	C									1						2		
	D															1		
India	C	11,112	10,687	15,334	11,544	2,471	857	2,551	2,989	3,161								
	D	5,933	5,689	8,123	6,131	1,252	473	1,314	1,511	1,571								
Bombay	C	13		21						2								
	D	7		9						1								
Calcutta	C	22	28	121	170	80	102	129	125	95	82	62	71		89	49		
	D	16	20	86	112	49	68	69	70	55	51	26	44		44	24		
Karikal	C		1		9	2	1	7	2	10	8	1		10			1	
	D				8	2	1	7	2	5	8	1		5			1	
Madras	C		201	99	72	4	5	7	4	3	1	4	18	18	23	11		
	D		67	47	29	5	3	2		5	1	3	5	6	8	2		
Negapatam	D			3	3													
Rangoon	C		1														2	
	D		1	1													1	
Tuticorin	C	5	1	1	1													
India (French):																		
Chandernagor	C	1	2	1	5	2	2	2	1	3	2	1		3		1		
	D		3	1	5	2	3	1		3	2			3		1		
Pondicherry	C	4	31	19	100	29	25	26	20	5	3	5	11	3	8	2		
	D	4	21	11	34	6	5	4	3	1	3							
India (Portuguese)	C		1															
Indo-China (see also table below):																		
Pnompenh	C	2		4	9					1	1							
	D	2		2	5		1					1		2				
Saigon and Cholon	C	3	9	6	4	1		1	3	2	3	7	15	25	23	34		
	D	1	4	3	4	2	1	1	1		3	6	13	20	18	25		
Persia: Rafsandjan	C													31				
	D													12				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Nov 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931: 14	March 21	March 28	April, 1931: 4	April 11	April 18	April 25	May, 1931: 2	May 9	May 16	May 23	May 30	June 6, 1931
Philippine Islands:[1]																		
Iloilo	C	1	1	2														
	D	3	1	2														
Provinces—																		
Capiz	C			59	186	29	11	4	4		3	8	18	11	3		3	4
	D			47	146	24	10	4	3		3	8	13	11	3		1	4
Iloilo	C	45	28	145	95	2	5											8
	D	27	22	110	65	2	2											6
Masbate	C					21												
	D					9												
Negros, Occidental	C	163	120	90	4													
	D	123	97	56	4													
Negros, Oriental	C			1														
	D			1														
Pampanga	C													1				
Samar	C	8	17															
	D	8	9															
Siam	C	6	2	3	1		4	4	2	1	1	1	13	11				
	D	6	2	1			1	1					4	3				
Ayudhaya District	C								1									
Bangkok	C	4	2	3	2		1	1	1	1		1	1	1	1	1		
	D	4	2	1	1		1	1				1	1			1		
Bismulok Province	C						4	4										
	D						1	1										

Place		October, 1930	November, 1930	December, 1930: 1-10	December 11-20	December 21-31	January, 1931: 1-10	January 11-20	January 21-31	February, 1931: 1-10	February 11-20	February 21-28	March, 1931: 1-10	March 11-20	March 21-31
Indo-China (French) (see also table above):															
Cambodia[2]	C	22	26	28			7	19	36	71	35	19	14		65
Cochin-China[2]	C	28	13	8			7	4	13	5	5	19	39		33

[1] Figures for cholera in the Philippine Islands are subject to correction.

[2] Reports incomplete.

PLAGUE

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931			April, 1931				May, 1931				
						14	21	28	4	11	18	25	2	9	16	23	30
Algeria:																	
Algiers	C	2	1	2	1				1								
	D								1								
Bone	C			1													
Constantine, vicinity of	C		50	1	1												
	D			1													
Philippeville	C		1														
	D		1														
Argentina:																	
Cordoba Province	C			1	2												
Entre Rios Province—Diamante	C				2												
Jujuy Province—Palpala	C			1	1												
Santa Fe	C				2												
Belgian Congo	C	1					2										
	D	1					2										
British East Africa (see also table below):																	
Tanganyika	C	3	2		22		8					3			5		
	D	3	2		4		1					10			2		
Uganda	C	111	67	25	15	4	7	4	4	8	3						
	D	112	67	24	15	4	7	4	4	8	3						
Ceylon: Colombo	C	9	9	8	11	1	3	3	1	1	3			1			
	D	8	9	6	13	1	3	2	1	1	2			1		5	
Plague-infected rats		2		2	3		3	1			1						
China. Amoy	C													1			
	D													1			
Dutch East Indies:																	
Batavia and West Java	C	208	239	180	141	18	31	23	12	19	24						
	D	206	238	168	128	17	28	23	12	18	23						
East Java and Madura	C			4	1	1		1	2								
	D			4	1	1		1	2								
Java and Madura	D	557	615	427	376	65	81	68	63	58	73	70	42				
Egypt:																	
Alexandria	C	4	3	1	2	1											
	D	1															
Plague-infected rats		3	1	1	1												
Assiout	C	9	7	26	41	6	10	1	1	5	16	8	3	4	5	8	1
	D	1	1	6	11		4	1	1		11	4	2	2	4	1	
Aswan	C	3															

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931: 14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9	16	23	30
Egypt—Continued.																	
Beni-Suef	C			1								10	2	3		2	
	D			1								3		1		2	
Cairo	C								1								
Deirout	C			21	16								3	7	1		2
	D			4	4								1	2	2		
Gharbieh	C			1													
	D			1													
Girga	C		7	1			14	37	35	31	9	4		1	1	5	
	D		2	1			2	5	17	13	3	5	1	1	1		
Kena	C							5				3				1	
	D							2				1				1	
Manfalut	C		23	30	15	3	5	9									
	D		5	6	5		2	1									
Minieh	C	1		2			2	1			1			5		1	
	D			1			1	1						2		1	
Hawaii Territory: Hamakua—Plague-infected rats																1	
India	C	3,259	3,740	5,335	5,457	2,674	2,271	2,462	1,732	2,503							
	D	1,856	2,226	3,422	3,661	1,887	1,624	2,009	1,526	1,980							
Bassein	C		2	4	1								1			1	
	D		1	3	1								1			1	
Bombay	C			1	1	1	1	1	1	4	4	1	2	5		1	
	D			1	1		2	1		4	4		3	4	1	1	
Plague-infected rats		32	38	34	32	17	14	21	18	34	43	30	30	26	30	17	
Calcutta	C									1	1						
	D									1	1						
Madras Presidency	C	148	220	312	74	9	12	7		3							
	D	78	154	182	46	4	12	5		2							
Rangoon	C		2	2				1		1				1			
	D		1	1				1		1				1			
Plague-infected rats		4	2	4	8				1	1	3			1	1	3	
Indo-China (see also table below): Pnompenh	C	6	1	7	1												
	D	6	1	7	4	2	1	1	2	2	1	1					
Iraq: Baghdad	C	4		5	3	1	3	3	1		5	10	8	7	10	4	2
	D	2		4	2		3	1	1		2	5	1	3	4	2	

Madagascar (see also table below):[2] Tamatave	C	4	2	9													
	D	3															
Morocco	C		19	13													
	D		8	4													
Nigeria: Lagos	C	9	5	1						2	2	1					
	D	9	5	1						2	2	1					
Plague-infected rats		5	5							3	3						
Peru (see table below).																	
Senegal (see table below).																	
Siam	C			4	18	2	2			1							
	D			2	14	1	1			1							
Bangkok	C	1	3	8	6	29											
	D	1	3	8	5	6											
Nagara Rajsima	C	11	17	9	7			1									
	D	9	10	10	6												
Syria: Beirut	C		1	1	1												
Tripolitania	C	13		8	1	1											
	D	1		3													
Tunisia: Tunis	C	P	13	1	14		5		5	5	7		4			1	
	D				7				4	4	2		2				
Union of Socialist Soviet Republics:																	
Gouranduz	D			28													
Transcaucasia—Karabakh	C			6													
Union of South Africa:																	
Cape Province	C	P							2	1							
Orange Free State	C		2	P	1	2		4	P	1	1						
	D		2		1			1		1	1						
On vessel. S. S. Marionga de Thermiotis at Avonmouth	C		1														

Place		Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931
British East Africa (see also table above):							
Kenya	C	62	50	69	21	7	12
Indo-China (see also table above)	C	5	1			4	2
Madagascar (see also table above):							
Ambositra Province	C	44	95	100	92	70	
	D	44	87	96	88	66	
Antsirabe Province	C	18	27	66	84	83	
	D	18	26	57	79	74	
Miarinarivo Province	C	12	18	28	31	19	
	D	12	18	26	29	19	
Moramanga Province	C	19	13	7	7	1	
	D	19	11	5	7	1	
Tananarive Province	C	170	178	92	145	90	
	D	164	172	89	139	81	

Place		Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931
Peru	C	34	41	29	12		
	D	14	13	8	6		
Senegal:							
Baol[2]	D	4					
Dakar[2]	C						2
	D						1
Louga[2]	C	10				14	1
	D	3				6	
Rufisque[2]	C				2		
Thies[2]	C	27	2				
	D	23	1				
Tivaouane[2]	C	21	2				4
	D	25	1				

[2] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931: 14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9	16	23	30
Algeria:																	
Algiers	C		1	1	1			2			2						
Bone	C			1													
Constantine	C						1							1			
Oran	C	3															
Arabia: Aden	C			1	1												
Belgian Congo	C		79	50													
Belgium	C				1												
Brazil: Porto Alegre (alastrim)	C	36		3	7	7	12	16	14	20	19	8	6				
	D				1				1								
British East Africa (see also table below): Tanganyika	C	385	84	70	91	6	2										
	D	36	4	5	13	1	2										
British South Africa: Southern Rhodesia	C	18	18	13													
	D	3															
Canada:																	
Alberta	C	1	19	7	1												
British Columbia	C	1	3	2	8												
Manitoba	C			1	1												
Winnipeg	C		1		1									4			
Nova Scotia	C			1				1									
Ontario	C	23	17	49	29	2	3	3	1	4		6	7	17	5		
Kingston	C		6	1	1							2	3				
North Bay	C		2		1												
Ottawa	C	12	2	3	1												
Sault Ste. Marie	C		1	30	2					3	1				1		
Toronto	C	4				1		1			4			1			
Quebec	C	2		2													
Saskatchewan	C	18		38	63	40	10	8		5	16	3	22	7	15	18	
Regina	C				1			2				2		2			
Canary Islands: Las Palmas	C							1									
China:																	
Amoy	C							1					2	2			
	D							1					1	1			
Canton	C				3	1	2	2	2	1	2	1				1	
Chungking	C	P	2														

Foochow	C	P	P	P	P		P		P	P							
Hong Kong	C		1	1	9			1	1		1	2					
	D				3			2				1		1			
Manchuria—																	
Harbin	C			1	4	1		1									
Kwantung—Dairen	C	4	1					2				1	1				
	D	1															
Nanking	C	P	P	P	P		P	P	P	P	P	P	P				
Shanghai—																	
Foreigners only	C	8	14	12	16	3	1	1	1	2	1	2	2	1	4	1	
Including natives	D	4	11	13	14	5	2	2	1	2	7	4	5	1		3	
Swatow	D	3	5	7	13	3	6	9	8	2							
Tientsin	C	2		1													
Chosen (see table below).																	
Colombia. Cali	D	1												1			
Dutch East Indies: Java—Batavia and West Java	C	6	4	29	2	1											
	D	2	2	2	1												
France (see table below).																	
Great Britain:																	
England and Wales	C	508	665	958	745	171	219	226	179	177	163	212	192	186	165	111	
Bradford	C	1	1	4	1		1		1	1		1	4	1	3	1	
Leeds	C		2						1		1	1		1		1	
London	C	184	161	149	98	26	54	32	35	51	39	84	53	66	44	37	
London and Great Towns	C	433	560	693	683	117	154	166	117	142	126	162	128	139	108	84	
	D	1			1							1					
Sheffield	C			3	32	2	1	6	1	4	2	1					
Stoke-on-Trent	C			1	1												
Greece (see table below).																	
Honduras.																	
Amapala	C				1												
Ocotopeque and Gracias districts	C				P												
Puerto Castilla	C		4	11	3												
Tegucigalpa	C											1					
Tela	C										1						
India	C	3,627	5,623	9,623	12,222	3,440	1,695	3,395	3,261	3,980							
	D	874	1,381	2,245	2,660	655	303	655	638	807							
Bombay	C	1	2	7	6	4	1	4	1	2	2	1	3	3		6	
	D	1	2	1	3		1	2	1	1			4	1	1	1	
Calcutta	C	18	59	143	251	53	69	75	86	101	60	61	65	24	30	19	
	D	11	40	100	188	36	54	50	63	78	42	50	54	18	25	17	
Cochin	C	22	15	29	59	15	17	14		10	11	12	6	3			
	D	4	1		3												
Karachi	C	3		3	4		3		1		5		1				
	D	1		2				2									
Madras	C	20	4	16	8	6	3	9	4	12	4	1	2	1	3	3	
	D	3			1		2	1		2	1	1	1		1	5	
Moulmein	C			2													
Negapatam	C	6								1	1		1				
Rangoon	C	1			4	1	1	1		2	2	1	6	7	5		
	D					1							1	2	1	1	
Vizagapatam	C			1	8	1		1		2	2	4	2			5	
	D				2			1		1		1				1	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931: 14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9	16	23	30
India (French):																	
Chandernagor	C		5	9	12	3	3	6	2	3	1			3		4	
	D		3	1	1				2	3	1			3		2	
Karikal	C		3	5	19			3			1	1	2	1		1	
	D		2	4	18						1		2	1			
Pondicherry Province	C	19	34	45	19	7		4	3	3			3	1	2	7	
	D	17	32	45	19	7		4	3	3	3		3	1	2	7	
India (Portuguese)	C		4	5	14		3	5			19	2					
	D				3		1	2			4	2					
Indo-China (see also table below):																	
Pnompenh	C	1	2	1		1										1	
	D	1		1													
Saigon and Cholon	C	2		6	4	4	1	1	2	1					1		
	D	2		4	1	3	1	2	2	1					1		
Iraq:																	
Baghdad	C				9							1	1				
Mosul Liwa	C	16	1	3	5												
	D	2			1												
Ivory Coast (see table below).																	
Japan:																	
Kobe	C				2												
Taiwan	C			1													
Mexico (see also table below):																	
Jalisco (State)—Guadalajara	D	3		1				1					1	1		1	
Mexico City and surrounding territory	C	6	10		23	13	13	7		17	9	11	6	4	10		
	D	6	6	1	8	5	5	6	6	4	6	4		4	3		
Torreon	C										1				1		
	D										2						
Vera Cruz	C				3		1	1			1		1	1			
Morocco (see table below).																	
Nicaragua: Porto Cabezas	C		2														
Nigeria: Lagos	C							2									
Panama Canal Zone	C			2													
Poland	C	3	25		1												
Portugal: Lisbon	C	37	72	103	40	16	15	17	4	8	18	11	19	19			
Siam	C		1	4	2							1					
Somaliland, British: Boales	C	1															
	D		1														
Spain	C	P	P	P	P	P	P	P									

Straits Settlements	C	17	6	7	2			2	1	1		1					
	D	7	3	1	1			1		1	1						
Sudan (Anglo-Egyptian)	C	50	64	11	97	3	1	4					3		3		1
	D	5	6	7	10		1	1									
Sudan (French) (see table below).																	
Syria (see table below).																	
Tunisia: Tunis	C		17	8				4									
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P	P	P			P	P	P	P						
Orange Free State	C	P		P	P			P	P	P	P						
Transvaal	C	P	P	P	P	P		P									
Upper Volta	C	6	4		18			3			3			1			
	D		2					1									
On vessel:																	
S. S. Clan Mactoggart at Suez	C				2												
S. S. Muncaster Castle at Manila from Hong Kong	C		1														
S. S. Matheran at Suez from Calcutta	C			1													
S. S. Clan Buchanan at Suez	C				2												
S. S. Rotterdam at Naples from Venice	C							1									
S. S. Clan McTavish at Manila from Chittagong	C										1						
S. S. Benvenue at Sydney from Shanghai	C			1													
S. S. Clan MacBrayne at Cochin	C				1												
S. S. Chilka at Rangoon	C				1												
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C												1				
S. S. Talodi at Soakim	C														1		

Place		Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931
British East Africa (see also table above):							
Kenya	C	653					
Chosen	C			1		11	
	D			1		3	
France	C			4	16		

Place		Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931
Greece	C		4		4		
Mexico (see also table above)	D		1		3		1
Morocco	C	20	25		4	6	7
Turkey	C	65	116		37	1	
	D	1	9		6		

Place		October, 1930	November, 1930	December, 1930			January, 1931			February, 1931			March, 1931		
				1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-28	1-10	11-20	21-31
Indo-China (see also table above)	C	258	86	38	9	14	47	48	46	95	46	27	125		139
Ivory Coast	C	4	2	9											
Sudan (French)	C	17		43		96							4		P
	D	2		16		4									
Syria: Beirut	C							1							

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths, P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931: 14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9	16	23	30
Algeria:																	
Algiers	C	2			2			3				2	1	3			
Constantine Department	C	2	6	31	4		1		2	2		6	1	8	3		
Oran	C	5		3	1							1		1			
Australia, Western	C		3						1								
Bulgaria	C	11	1	13	5				9		26	4					
	D								2		3						
Chile: Valparaiso	D						1										
China:																	
Canton	C			2		1											
Manchuria—Harbin	C	1		3	5			3				8					
Shanghai	C			2													
Tientsin	C	1								1	1						
Chosen (see table below).																	
Czechoslovakia (see table below).																	
Egypt:																	
Alexandria	C	2									1						
	D											1					
Beheira Province	C		1							3	1						
	D		1							2							
Cairo	C	1	1	1													
Port Said	C			1													
Eritrea: Asmara	C					1											
Great Britain: Scotland	C			1													
Glasgow	C			2													
	D			1													
Greece (see table below).																	
Guatemala.[1]																	
Iraq: Baghdad	C				5	1								2			
	D				1									1			

Place																	
Irish Free State:																	
Kerry County—Dingle	C													1			
Mayo County—Belmullet	C										1						
Latvia (see table below).																	
Lithuania (see table below).																	
Mexico (see also table below):																	
Durango	D			1													
Mexico City, including municipalities in Federal District	C	14	12	39	35	46	66	73	31	67	34	38	31	16	27		
	D	7	10	34	16	20	13	31	20	18	7	17	14	9	7		
San Luis Potosi	D	2			5	1	1	2	1	1	2					1	1
Morocco	C	1	8	8	28	2	2	3			1		12		13		
	D			2	1								1		2		
Palestine	C	7	4	2	3	2	1	1	1	1	2		2	2	1	1	
Panama Canal Zone—Balboa	C														1		
Paraguay: Asuncion	D			4													
Poland	C	42	63	106	189	62	58	85	82	93	176	140	129	92	81		
	D	7	3	8	19	4		7	4	8	7	6	7	6	4		
Portugal: Oporto	C	6		1													
Rumania	C	34	113	193	152	55	53	52	54	70							
	D	3	5	16	24	4	5	3	4	8							
Spain	C	1															
	D	1															
Syria	C														1	3	
Tunisia:																	
Sbeitla, vicinity of	C								20	2			10				
	D								7								
Sfax	C							2									
Tunis	C	28		16	18	5	2	7		2			10		9	8	
Turkey (see table below)																	
Union of South Africa:																	
Cape Province	C	P	P	P	P	1		P	P	P	P	P					
Municipality of East London	C	1	3	3				P	P								
Natal	C		P	P	P		1	P	P	P	P	P					
Orange Free State	C		P	P	P	P				P	P	P					
Transvaal	C	P	P	P	P	P		P	P	P	P	P					
Yugoslavia (see table below).																	

Place		Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931
Chosen: Seoul	C	1	1	1		3	
Czechoslovakia	C	16	24	60	26		
Greece	C	4	10	10	17	8	
	D			2	2	1	
Latvia	C				12		

Place		Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931
Lithuania	C	5	6	28	3	22	32
	D	1	3	3	1	2	3
Mexico (see also table above)	D	47	47				
Turkey	C	3	2		18		
Yugoslavia	C	2	1	20	12	10	43
	D		1	2		1	5

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reports an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases, D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Week ended— February, 1931			March, 1931				April, 1931				May, 1931			
					14	21	28	7	14	21	28	4	11	18	25	2	9	16	23
Brazil:																			
Bahia State	C								1	1									
Ceara State	C			1					2							2		1	
	D			1												2		1	
Minas Geraes State	C									2			1		2	2	1		1
	D									1					1	1	1		
Rio de Janeiro State	C									1								1	1
	D							1	1	1									
Cambucy	C			3	1			1	1										
	D			3	1														
Friburgo (imported)	C			1															
Padua	C			2	1														
	D			2	1														
British Cameroon: Mamfe	C																	3	
	D																	1	

×

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Prevalence of Undulant Fever in the United States

Neuropathology of Comparatively Rapid Carbon-monoxide Asphyxia

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HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

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PREVALENCE OF UNDULANT FEVER IN THE UNITED STATES

By H. E. Hasseltine, *Senior Surgeon, United States Public Health Service*

The purpose of this note is to give information concerning the prevalence of undulant fever in the United States for the years 1929 and 1930. Reports received from State health authorities showing the number of cases reported each month are published in the Public Health Reports. These published figures have been tabulated by States and by months and then submitted to the State health department of each State for verification and correction. Replies were received from 46 States for each year. This is the beginning of an attempt to determine the seasonal prevalence of undulant fever in the United States. The first suggestion of seasonal prevalence was noted in 1929, and a similar rise and fall was noted in 1930, though not following closely the 1929 curve.

It should be pointed out that in the vast majority of instances these figures represent the month of *reporting* the case, instead of the month of onset. The onset is not always easy to determine, for it is so gradual that the patient frequently is unable to determine the exact date on which his illness began. In some instances the diagnosis is long delayed, and so it is possible that cases reported in a given year may have begun one or two years prior to date of report.

The accompanying table shows the reported cases of undulant fever by States for the years 1929 and 1930.

TABLE 1.—*Prevalence of undulant fever by months in the United States as reported through State health departments*

State	1929													1930												
	January	February	March	April	May	June	July	August	September	October	November	December	Total	January	February	March	April	May	June	July	August	September	October	November	December	Total
Alabama		1			1	2	3		3	3	3	1	17	1	1	2	2	4	1		1	2	2	2	5	23
Arizona	3			1			1	2	1		3	2	13	1	2	1	1	1	3	1	3		1		2	16
Arkansas		1									1		2		1	1										2
California	2	1	5	6	6	6	5	9	5	14	9	4	72	9	7	8	8	6	13	12	9	13	10	13	7	115
Colorado				1	1		1			1	1		5												2	2
Connecticut		1		1	2		2		3	1	2		12	4			1	1	2	1			1	2	9	21
Delaware		1							1	2	1		5	1	2		1			2	1					7
District of Columbia			1										1									1				*1
Florida						1	1	1	1		4		8	2	2											4
Georgia				1				1	4	6	2		14		1		1	3	6	5	4	3	2	3		28
Idaho										1			1										2			2
Illinois	1		2	2	2	3	5	4	3	5	8	4	39	2	6	6	6	6	8	10	4	2	4	5	4	63
Indiana								3	3	2	4	1	13	1	1		3	6	4	5	8	3				31
Iowa	2	6	13	19	12	16	15	21	26	13	4	11	158	13	14	10	12	13	24	15	8	7	8	11	10	145
Kansas	8	1	2	6	6	4	11	18	16	4	4	5	85	10	2	3	8	9	13	17	3	9	10	6	10	100
Kentucky						2	8	1		1		1	13						1			3	4			8
Louisiana				4	1	4	6	1				1	17			2	2			2	3	2	2	4	3	20
Maine		1		3				2	1			1	8		1	2	1	1	2		1				2	10
Maryland		1	2	1	4	2	3	1	2		1	1	18	2	2	3	2	1	3	4	1	5		6	1	30
Massachusetts		1				1	1		1	1		2	7	4		2		1		1	1		3			12
Michigan			1					1				2	4	1	2	1	2	1	1	3	1	1		1	1	15
Minnesota	1	1	5	7	2	4	10	3	5	3	1	3	45	3	2	2	3	8	5	8	5	8	8	3	9	64
Mississippi								2	1				3					1	1	2		1		1	1	7
Missouri					1			1	26	12	5	5	50	5	12	6	10	8	18	17	31	10	6	10	4	137
Montana				1	2								3	1				1	1		1					4
Nebraska								1	3	1		3	8	1		1	1		2			1		2		8
Nevada										2	1		3													0
New Hampshire			1										1		1			1								2
New Jersey	2		3	1		2	1		2	2			13		2		1					1	5	5	3	17
New Mexico									2				2	1					1							2
New York	3	4	5	4	10	11	14	7	8	19	13	6	104	9	7	7	13	13	6	11	4	29	29	18	15	161
North Carolina						1							1		1									1		2
North Dakota					1	1				2	1		5	1	2		2	1		2			1		1	10
Ohio	2	11	2	3	11	6	4	4	10	8	9	3	73	10	4	2	8	37	10	10	5	13	7	12	5	123
Oklahoma								1			1	1	3										2			2
Oregon	1			2	1	2	5		3	2		3	19	3	1	3	6	2	1		1	2	2	3	2	26
Pennsylvania		1				1	2	6	11	1	2	1	25	1	5	5	2	4	1	4	3	1	3	4		33
Rhode Island												2	2	1	1											2
South Carolina														0		1		1	1	1	1	1		1		7

South Dakota													0								3		1			4
Tennessee			1			1	1				2		5	1	1		1			3	3	1		1		11
Texas				1	1			1					3					1						2		3
Utah													0													0
Vermont										2			2	2	1	4	1	1			2	2	2	2	2	19
Virginia		1					1		2				4			1	2	4	2	8	3	1	1	1	1	24
Washington				1					10	8		3	22		3	2	1	2	4	6	2	5	1	7		33
West Virginia													0			1										1
Wisconsin	2	2	7	2	5	4	7	2	5	5		1	42	1	3	4	3			3	2	2	8		2	[b] 28
Wyoming											1	1	2		1	1										2
Total	27	35	50	67	69	74	107	93	158	121	83	68	952	91	90	80	104	138	134	153	114	129	125	126	101	1,385

[a] Cases in the District of Columbia included from personal knowledge of author; no cases reported through health department.

[b] Wisconsin State Department of Health states that 82 cases were brought to their attention in 1930, but only 28 (taken from Public Health Reports) showed the month of their occurrence.

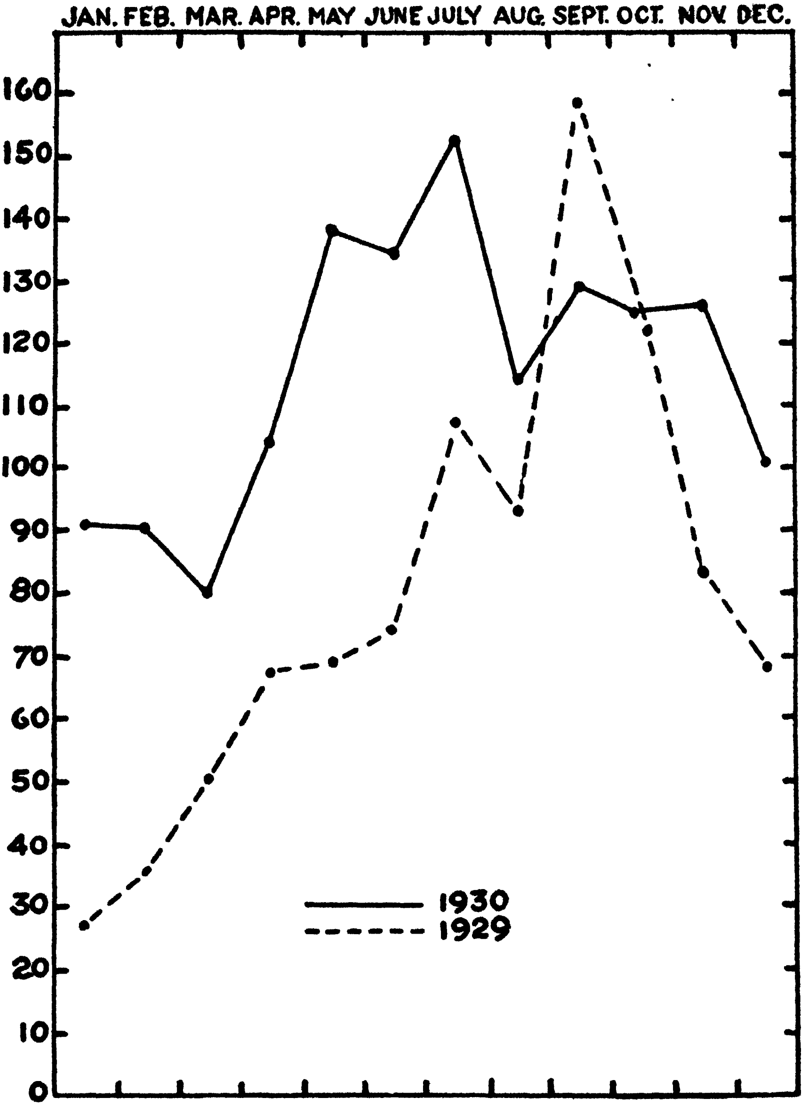

CHART 1.—Undulant fever, by months, in the United States, 1929 and 1930

Though the table shows but 952 cases officially reported in 1929, Simpson [1] collected information from both official and unofficial sources and obtained a total of 1,305 cases for the year 1929.

Undulant fever is a reportable disease in 32 States, not reportable in 7, and no information on this question was received from 9.

The prevalence by months for the two years is shown graphically in the chart.

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[1] Simpson, W. M.: Undulant fever (Brucelliasis). A clinopathologic study of 90 cases occurring in and about Dayton, Ohio. Annals of Internal Medicine, vol. 4, No. 3, September, 1930, pp. 238-259.

While the curves for the two years show a general resemblance, it will be noted that the curve for 1930 is less sharp and the peak was reached two months earlier. This warns us that observations should be made for several years before we can draw any conclusions as to seasonal prevalence.

STUDIES IN ASPHYXIA

I. NEUROPATHOLOGY RESULTING FROM COMPARATIVELY RAPID CARBON-MONOXIDE ASPHYXIA [1]

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INTRODUCTION

The chemical and pathological reaction of dogs to asphyxia by carbon monoxide and by atmospheres which are deficient in oxygen has been studied during the past two years by the United States Bureau of Mines. These studies have been conducted for the purpose of obtaining fundamental information on the response of the organism to asphyxial environment, with the particular viewpoint of devising a procedure for treating moribund cases of carbon-monoxide poisoning. It has been repeatedly observed that many of these cases have a fatal termination, even though respiration has been induced and the carbon monoxide removed from the blood.

WORK OF PREVIOUS INVESTIGATORS

A review of the work of previous investigators has recently been published by one of the writers [2] and therefore will not be included in this report.

OUTLINE OF INVESTIGATION

The scope of this series of investigations includes the reactions attending comparatively rapid asphyxia resulting from exposure to conditions which cause death in dogs in 20 to 30 minutes, and comparatively slow, prolonged asphyxia resulting from exposure to conditions which maintain a serious state of asphyxia during 8 to 16 hours with possible death at the end of that period. Experience has shown that this latter condition is the most unresponsive to present methods of treatment. In some of the experiments the exposure was continuous until death occurred, in others it was terminated when the first indication of terminal symptoms was observed. In the

[1] Published by permission of the Director, U. S. Bureau of Mines.

[2] Sayers R. R., and Davenport, S. J.: Review of Carbon-Monoxide Poisoning. Public Health Bulletin No. 195 (1930), U. S. Public Health Service.

latter instance some of the animals recovered from the acute effects while others died within periods of time varying from a few hours up to three days. Those that recovered were kept for observation for periods varying from a week to five months.

As previously stated, the investigations included asphyxia produced by carbon monoxide and that produced by atmospheres deficient in oxygen. The information obtained from a study of the latter not only is important in the treatment of accidents resulting from oxygen-depleted atmospheres, but it also gives fundamental information on simple asphyxia. It likewise, through a comparison of findings, yields information on whether or not the reaction to carbon monoxide is wholly or in part due to a specific action, or merely to a type of asphyxia.

The blood of the animals was examined, both during and following exposure, for sugar, nonprotein nitrogen, urea, uric acid, total and preformed creatinine, lactic acid, calcium, phosphates, hydrogen-ion concentration, carbon dioxide, oxygen, carbon monoxide, carbon-dioxide capacity, hemoglobin, red-cell and white-cell counts, and differential counts. All animals were autopsied immediately after death or killed for autopsy at the end of the observation period. Observations were made for gross pathological changes, and specimens of tissue were taken for microscopic examination.

SCOPE OF PRESENT REPORT

This is the first of a series of reports in which the results of the investigations as previously outlined will be given. It deals specifically with the neuropathology found in four dogs after continuous exposures of 20 to 30 minutes to 0.6 per cent carbon monoxide in air by volume. These conditions produced 75 to 85 per cent carbon-monoxide hemoglobin and resulted in death at the end of the period of exposure.

APPARATUS AND EXPERIMENTAL PROCEDURE

A detailed description of the apparatus and technique for making the animal exposures will be given in a succeeding report. Briefly, the carbon monoxide–air mixture was circulated from a large reservoir through a mask over the head of the animal. This procedure, rather than that of placing the animals in a test chamber, was followed in order to facilitate making observations and obtaining blood specimens during the exposure period. Care was taken to arrange the mask so that it would be under about one inch of water positive pressure and also to have sufficient circulation to remove expired air and prevent

rebreathing. The atmosphere supplied to the animal was continuously analyzed with a carbon-monoxide recording apparatus.[3]

The animals were autopsied immediately after death and the brain was removed. The brain tissue was fixed in Carnoy's solution and in Zenker's solution. Blocks of tissue of 2 millimeters or less in thickness were taken from the motor cortex, corpus striatum, mesencephalon, middle of pons, medulla oblongata, and spinal cord. These were embedded in paraffin and sections made 5 to 7 microns in thickness. The Zenker-fixed material was stained with hematoxylin and eosin. In this investigation, practically all the study was made on the Carnoy-fixed material that was stained for Nissl granules by toluidin and erythrosin, because this preparation afforded more detail.

MICROSCOPIC PATHOLOGY

CORTEX

There was both a perineuronal and perivascular edema in the cortex. With the exception of some of the large motor cells, which showed relatively little change, practically the entire cortex was severely damaged. In many regions of the cortex the deeper layers of cells showed more severe degenerative changes than the superficial or outermost layer. Most of the cells showed central chromatolysis with swollen and distorted nuclei. Many of the pyramidal cells were stained uniformly a dark blue. (See figs. 2 to 5, inclusive.) The capillaries were dilated. Stasis was marked. Occasionally, the perivascular space was infiltrated with leucocytes. Occasional areas of hemorrhage were found. These were no larger than would occur by diapedesis. (See figs. 6 to 10, inclusive.)

The olfactory cortex showed particularly severe damage. The nerve cells were fragmented. Their nuclei were greatly swollen, vacuolated, and distorted. There was marked perineuronal and perivascular edema.

THALAMUS

Edema of the thalamus was very marked, both perivascular and perineuronal. Some of the neurons appeared shrunken. There was a slight central chromatolysis. The nuclei were eccentric and distorted. Some of the cells were fragmented.

CORPUS STRIATUM

The corpus striatum presented severe degenerative changes. There was very marked perivascular and perineuronal edema. Many neurons seem to have been ruptured. The cytoplasm was fragmented and vacuolated. There was a marked chromatolysis. The

[3] Katz, S. H., Reynolds, D. A., Frevert, H. W., and Bloomfield, J. J.: A carbon-monoxide recorder and alarm. U. S. Bureau of Mines Tech. Paper 355 (1926).

nuclei were swollen, distorted, and vacuolated. In many instances nothing appeared to be left except the nucleus around which was a little Nissl material; then a clear space marking the site of the original cytoplasm of the neuron. Some of the nerve cells were uniformly, darkly stained and others appeared to be invaded by satellite cells. There was marked stasis and the vessels were dilated. (See figs. 11 and 12.)

MESENCEPHALON

The section through the colliculi of the mesencephalon showed dilation of the vessels, stasis and marked perivascular and perineuronal edema. The large polygonal-shaped cells with large Nissl granules (cells of the tecto-spinal tract) showed relatively little change as compared with the small cells. The latter showed a chromatolysis and swelling of the nuclei. (See figs. 13 and 14.)

Oculomotor nucleus.—Most of the cells of the oculomotor nucleus showed very little chromatolysis. A few were shrunken and stained uniformly a dark blue. There was practically no perineuronal edema. The vessel in the nucleus was dilated and showed stasis with perivascular edema. The nucleus as a whole did not show much damage. (See fig. 15.)

Trochlear nucleus.—Most of the cells of the trochlear nucleus showed no degenerative changes. A few of the cells were shrunken and stained uniformly a dark blue. The nucleus showed about the same damage as the oculomotor nucleus. The section appeared very similar to the nucleus of the oculomotor, shown in Figure 15.

Nucleus ruber.—The nucleus ruber, as a whole, appeared to be quite normal. In some of the cells the Nissl granules were dustlike between the nucleus and periphery of the cell. There was no perineuronal edema. The nuclei of the cells appeared normal. (See fig. 16.)

Substantia nigra.—Most of the cells of the substantia nigra showed a central chromatolysis. The Nissl granules in the periphery of the cell were large. Some of the neurons were shrunken. There was a slight edema throughout the substantia nigra. Many of the cells were stained homogeneously a dark blue. (See fig. 17.)

Mesencephalic nucleus of the trigeminal nerve.—The cells were shrunken and stained homogeneously dark blue. The perineuronal edema was marked. (See fig. 14.)

Interpeduncular ganglion.—The interpeduncular ganglion showed marked perivascular and perineuronal edema, and chromatolysis.

PONS

Nuclei pontis.—The neurons of the nuclei pontis showed marked central chromatolysis throughout the nucleus. The nuclei were eccentric and distorted. There was a slight perineuronal edema.

FIGURE 1.—Section through the cortex of a control brain. (Reduced one-third from photomicrograph of 81 diameter magnification)

FIGURE 2.—Section through the cortex showing perineuronal and perivascular edema and degenerative changes in the nerve cells. (Magnification 81 ×, reduced one-third)

FIGURE 3.—Same section as in Figure 1. (Magnification 333 ×, reduced one-third)

FIGURE 4.—Same section as in Figure 2. (Magnification 375 ×, reduced one-third)

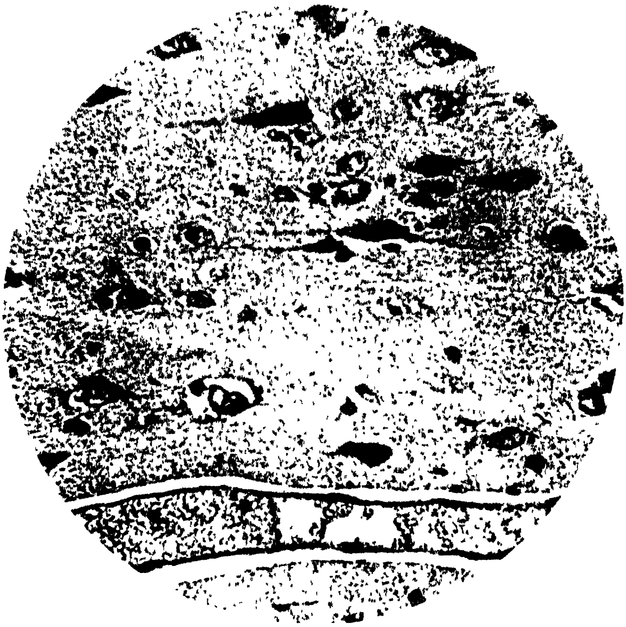
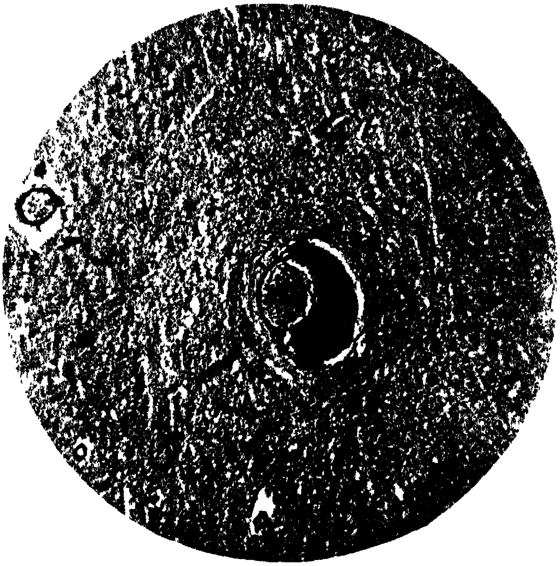


FIGURE 5.—Section through the cortex showing the two types of neuron reaction, i. e., shrinkage, with diffuse dark staining, and chromatolysis; also the vascular reaction of dilatation, stasis, and perivascular edema. (Magnification 400 ×.)

FIGURES 6 (right) and 7.—Section through the cortex showing dilatation, perivascular edema, and stasis. (Magnification 100 ×, reduced one-third.)



(Magnification 81 ×)

(Magnification 353 ×, reduced one-third)

(Magnification 7[illegible]0 ×, reduced one-third)

FIGURES 8 (above), 9 (right), and 10. Section through medullary substance of cortex showing dilitation, stasis, perivascular edema, and hemorrhage, under magnifications stated

PLATE IV

FIGURES 11 (right) and 12.—Section through the corpus striatum showing edema and degenerative nerve cell changes. (Magnification, 81 × and 353 ×, respectively, reduced one-third.)

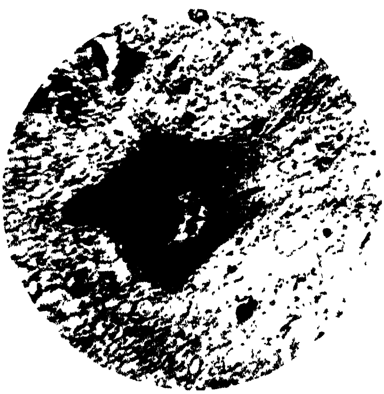


FIGURE 13.—Section through the mesencephalon showing a normal cell in the colliculus. It is a cell in the nucleus of the tectospinal tract. (Magnification 750 ×, reduced one-third.)

FIGURE 14.—Section through the mesencephalon showing marked perineuronal edema and diffuse staining of the cells in the mesencephalic nucleus of the trigeminal nerve. (Magnification 750 ×, reduced one-third.)

FIGURE 15.—Section through the oculomotor nucleus showing diffuse staining and slight perineuronal edema of a few nerve cells, most of them being relatively normal. (Magnification 100 ×, reduced one-third.)

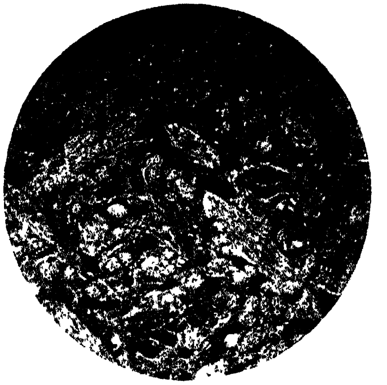
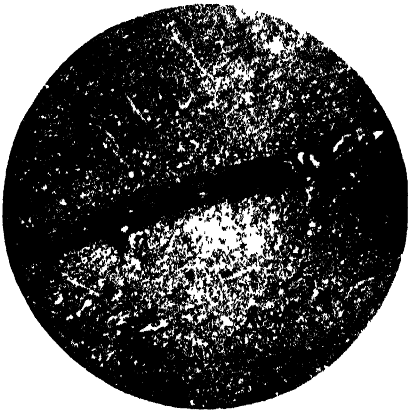


FIGURE 16.—Section through the nucleus ruber showing most of the nerve cells to be normal and the absence of edema. (Magnification 100 ×, reduced one-third.)

FIGURE 17.—Section through the substantia nigra showing slight edema and central chromatolysis. (Magnification 750 ×.)



FIGURES 18 (right) and 19.—Section through the reticular formation showing perivascular hemorrhage with occlusion of vessel. (Magnifications 100 × and 400 ×, respectively, reduced one-third.)

FIGURE 20.—Section through the medulla oblongata in the region of the decussation of the pyramidal tracts showing edema and dark diffuse staining of the nerve cells in the dorsal sensory area. (Magnification 100 ×, reduced one-third.)

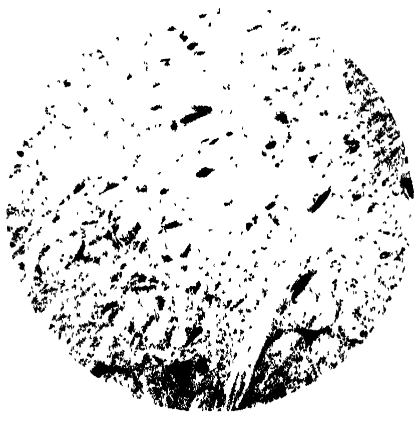


FIGURE 21.—Section showing practically no perineuronal edema and relatively normal nerve cells in the motor area of the same slide as reproduced in Figure 20. (Magnification 100 ×, reduced one-third.)

FIGURE 22 —Section through the inferior olive showing slight edema and central chromatolysis. (Magnification 750 ×, reduced one-third)

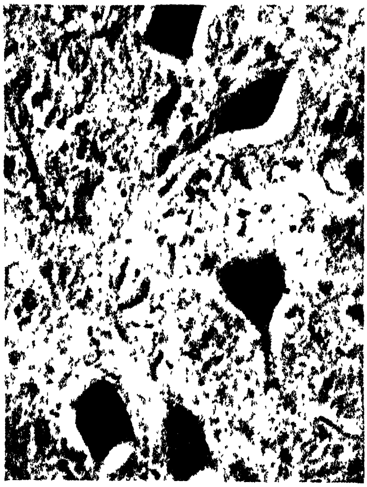
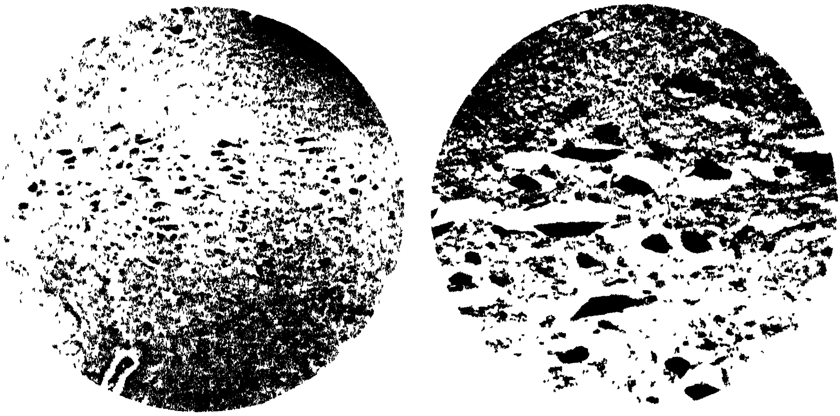
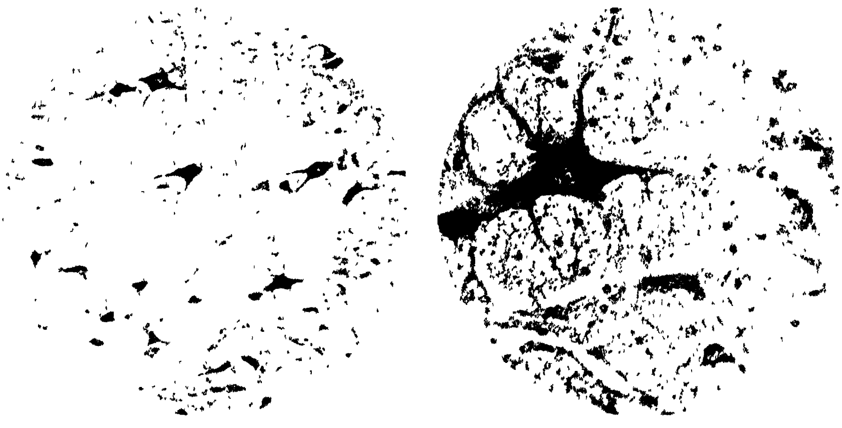


FIGURE 23 —Section through the hypoglossal nucleus showing slight perineuronal edema and diffuse staining of few of the nerve cells (Magnification 750 ×, reduced one-third)

FIGURE 21 —Section through the dorsal motor nucleus of the vagus nerve in a control brain (Magnification 750 ×)



FIGURES 25 (right) and 26.—Section through the dorsal motor nucleus of the vagus nerve showing severe perineuronal edema, shrinkage, and diffuse, dark staining of the nerve cells. (Magnifications 100 × and 600 ×, reduced one-third)



FIGURES 27 (right) and 28. Section through the reticular formation of the medulla oblongata showing normal neurons. (Magnifications 100 × and 600 ×, respectively, reduced one third)

FIGURE 29. Section through the medulla oblongata showing dilatation and perivascular hemorrhage in the reticular formation (Magnification 300 ×, reduced about one-fourth)

FIGURE 30. Section through the reticular formation of the medulla oblongata showing marked degenerative changes in cell of an unidentified nucleus. (Magnification 750 ×)

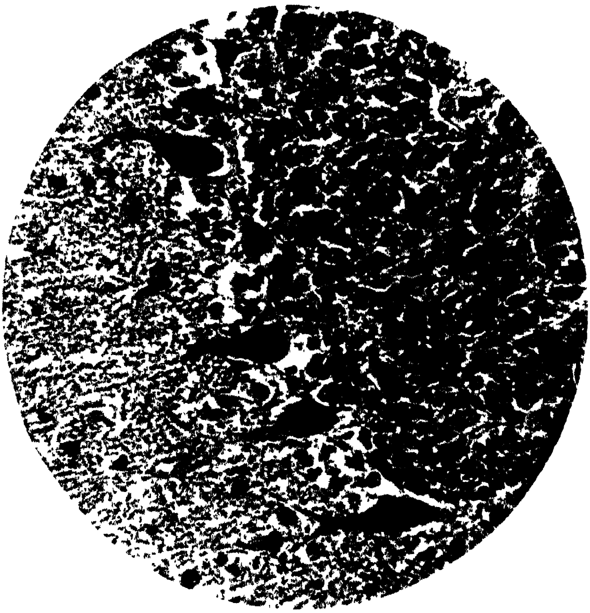


FIGURE 31.—Section through the cerebellum showing perineuronal edema and central chromatolysis in the Purkinje cells. (Magnification 300 ×.)

This was very similar to the findings in the substantia nigra as shown in Figure 17.

Nucleus of the abducens nerve.—Most of the neurons of the abducens nerve showed practically no degenerative change. Some of the cells were shrunken. The perineuronal edema was slight. This was very similar to the findings in the oculomotor nucleus as shown in Figure 15.

Nucleus of the facial nerve.—Most of the neurons of the facial nerve showed no damage. A few were shrunken. Some of the nerve cells showed a slight perineuronal edema. This was similar to the findings in the oculomotor nucleus as shown in Figure 15.

Nucleus of trigeminal nerve.—Most of the small cells of the trigeminal nerve showed severe degenerative changes. Many showed central chromatolysis. Some of the cytoplasm was fragmented. Nuclei were swollen and distorted. The large polygonal-shaped cells of the motor nucleus showed relatively little change.

Cochlear nuclei.—Most of the neurons of the cochlear nuclei showed practically no damage. Some of the cells showed central chromatolysis with a slight perineuronal edema.

Nucleus of trapezoid body.—The nucleus of the trapezoid body showed relatively little change excepting a slight perineuronal edema.

Superior olivary nucleus.—Most of the cells of the superior olivary nucleus appeared normal, except for a slight perineuronal edema.

Reticular formation.—Throughout the reticular formation of the pons the vessels were dilated. There was stasis, perivascular edema, and a few small petechial hemorrhages. (See figs. 18 and 19.)

MEDULLA OBLONGATA

Nucleus cuneatus and nucleus gracilis.—The nucleus cuneatus and nucleus gracilis showed a severe edema. Many of the cells were shrunken. Some were stained homogeneously a dark blue. Many showed chromatolysis with large swollen nuclei. There was stasis and perivascular edema with a few small hemorrhages. (See figs. 20 and 21.)

Inferior olive.—Most of the cells of the inferior olive showed a central chromatolysis with slight perineuronal edema. (See fig. 22.)

Nucleus of hypoglossal nerve.—A few of the cells of the nucleus of the hypoglossal nerve showed chromatolysis. Their Nissl granules were large. Many of the cells were shrunken and there was a marked perineuronal edema. (See fig. 23.)

The dorsal motor nucleus of the vagus nerve.—The dorsal motor nucleus of the vagus nerve showed severe degenerative changes. The nerve cells were shrunken and stained homogeneously a dark blue. No nuclei were seen in these cells. The perineuronal edema was very severe. The degenerative changes in this nucleus were the most severe found in any center of the brain stem. (See figs. 24, 25, and 26.)

Nucleus of the tractus solitarius.—The nucleus of the tractus solitarius also showed severe degenerative changes. Most of the cells showed chromatolysis. Many were fragmented. The nuclei were swollen and distorted and there was a marked edema.

Nucleus ambiguus.—The nucleus ambiguus showed perineuronal edema. Most of the cells showed relatively no change, but some were shrunken and stained uniformly a dark blue.

Vestibular nucleus.—The large cells giving rise to the vestibulospinal tract showed relatively very little change. The smaller cells showed slight central chromatolysis, swollen distorted nuclei, and perineuronal edema.

Reticular formation.—Throughout the reticular formation of the entire brain stem many of the large polygonal-shaped cells showed no change. Also, the motor cells of the anterior horn in the area of pyramidal decussation appeared normal. (See figs. 27 and 28.) Occasional petechial hemorrhage was found. (See fig. 29.)

Unidentified nucleus.—A group of cells lying between the nucleus ambiguus and just dorsal to the lateral end of the inferior olive showed very marked chromatolysis with eccentric and distorted nuclei, and in some no nucleus was seen. (See fig. 30). Nerve cells of the reticular formation immediately around these cells showed no degenerative changes. (See figs. 27 and 28.)

In the region of the raphe between the two inferior olivary nuclei, there was another group of large cells showing marked central chromatolysis.

CEREBELLUM

The vessels of the cerebellum were dilated and packed with red blood cells. There was perivascular and perineuronal edema. Occasional petechial hemorrhages were found. Practically all the Purkinje cells (fig. 31) showed a severe central chromatolysis with distortion of the nucleus. In some instances only "shadows" of these cells were left. Occasionally the nucleus stained pink. Some of the Purkinje cells were shrunken and stained homogeneously a dark blue. Some cells in the granular layer appeared to be fused.

Some of the cells in the efferent nuclei showed relatively little change. Many showed central chromatolysis with distortion of the nucleus. A few were shrunken and uniformly stained a dark blue.

SUMMARY AND CONCLUSIONS

The neuropathology produced in dogs by fatal exposures of 20 to 30 minutes to 0.6 per cent carbon monoxide in air by volume was studied.

The brain, as a whole, showed a severe perivascular and perineuronal edema. This was most marked in the corpus striatum, the cortex, and the dorsal motor nucleus of the vagus nerve. The

vessels were greatly dilated and tightly packed with red blood cells. Stasis was marked throughout. There were a few petechial hemorrhages, especially in the corpus striatum and cortex. Most of these were not larger than would occur by diapedesis through the dilated vessels. Occasionally a few leucocytes, both lymphocytes and polymorphonuclear leucocytes, were found in the perivascular spaces. The endothelium of the capillaries appeared to be swollen in some areas.

The neurons were extensively damaged. Many of the nerve cells seem to have been ruptured. In some areas all that appeared to be left of the nerve cell was a swollen, distorted, and vacuolated nucleus with a little Nissl material around it. A clear space marked the site of the original cytoplasm of the neuron. In others there was a marked central chromatolysis with distorted nuclei. This was most pronounced in the cells of the nuclei pontis. The Nissl material was dust-like in some of the very large cells, as in some of the neurons of the nucleus ruber. In others the Nissl granules were abnormally large and decreased in number. Some of the cells, especially the small pyramidal cells in the cortex and the cells of the dorsal nucleus of the vagus, were shrunken and stained homogeneously a dark blue. The nuclei were swollen, distorted in shape, and frequently eccentric. They contained very little chromatin material. Many of the nerve cells were shrunken.

Many of the large polygonal-shaped cells containing well-developed Nissl granules, located throughout the reticular formation of the brain stem, showed practically no change. Likewise, the nuclei of the hypoglossal, abducens, trochlear, oculomotor nuclei, and nucleus ruber showed relatively little damage. The dorsal motor nucleus of the vagus nerve, dorsal sensory areas of the brain stem, the corpus striatum, and the cortex showed severe injury.

There was a variation in the degree of damage with different animals. With three of the four dogs studied the variation was not marked, but the fourth showed distinctly less damage. The foregoing findings were, however, present to some degree in all of the animals.

The following conclusions may be drawn:

1. The circulatory changes are characterized by dilatation, stasis, perivascular hemorrhage, and edema.

2. Edema is diffuse and severe. It is both perineuronal and perivascular.

3. There is a marked difference in the susceptibility of the nerve cells to oxygen deprivation. The cells of the cortex, corpus striatum, dorsal motor nucleus of the vagus, and the dorsal sensory areas of the medulla, are the most sensitive. The nucleus ruber, nuclei of the oculomotor, trochlear, abducens, and facial nerve, and the large polygonal cells in the reticular formation of the medulla are the least susceptible.

4. There are two general types of degenerative changes in the nerve cells following asphyxia: (*a*) Some become shrunken and stain diffusely; (*b*) others show varying degrees of chromatolysis.

5. Carbon monoxide produces a diffuse degenerative change throughout the entire brain.

6. In this type of asphyxia the most serious effect appears to be edema of the dorsal motor nucleus of the vagus and the adjacent area in the medulla oblongata.

ACKNOWLEDGMENTS

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DEATH RATES IN A GROUP OF INSURED PERSONS

Rates for Principal Causes of Death for April, 1931

The accompanying table, taken from the Statistical Bulletin for May, 1931, issued by the Metropolitan Life Insurance Co., presents the mortality record of the industrial insurance department of the company for April, 1931, as compared with that for the preceding month and for the corresponding month of last year. It also gives the cumulative rates for the period January-April for the years 1930 and 1931. The rates are based on a strength of approximately 19,000,000 insured persons in the United States and Canada. In recent years the general death rate in this selected group of persons has averaged about 72 per cent of the rate for the registration area of the United States.

With regard to health conditions in this group during April the Bulletin states:

Despite a bad beginning, due to widespread prevalence of influenza, 1931 is developing into a good health year. At the end of April the cumulative mortality rate was only 3.4 per cent above the figure for the like period of 1930, which was the record health year of all time.

Among approximately one and one-quarter millions of Canadian industrial policyholders the year-to-date death rate was over 8 per cent below the figure registered last year; while among the insured residing in the far western States the improvement this year was 5 per cent. In the remainder of the United States, however, where 87 per cent of the industrial policyholders live, the mortality rate for the January-April period rose 4.8 per cent as compared with last year.

Among the favorable health developments of 1931 to date, the two outstanding items relate to tuberculosis and diphtheria. For the former, a decline of 4.9 per cent has been recorded, despite the widespread prevalence of influenza, which always tends to increase the mortality from tuberculosis. The tuberculosis death rate for the month of April showed an improvement of more than 12 per cent as compared with the same month a year ago. It is probable that the decline in the tuberculosis death rate in 1931 will be well above the average year-to-year decrease which has been observed for about a decade. For diphtheria the outlook is that the largest decline ever experienced will be witnessed this year. At any rate, for the first four months the drop has amounted to 39 per cent as compared with the corresponding period of 1930.

The death rate for diseases incidental to pregnancy and childbirth is running lower than ever before, and declines, as compared with last year, are also in evidence for typhoid fever, whooping cough, diarrheal complaints, homicides, and accidents.

There are, nevertheless, a few decidedly unfavorable items in the health record of the year, apart from the considerable increase in the mortality from influenza-pneumonia. The most serious development relates to cancer. While the death rate for this disease has been steadily increasing for years, no marked rise has been recorded heretofore between any one year and its successor—such as will obtain this year if the increase of 9.1 per cent, recorded during the first four months, persists throughout the year. Such data as are available for the general population for the early months of 1931 also point strongly to an unusually large increase in mortality from cancer.

The situation with respect to diabetes is also distinctly unfavorable, with a much larger increase thus far in 1931 than has been shown for recent years. The influenza outbreak has doubtless been responsible for a part of this increase and has also been a factor in bringing about higher death rates for the principal "degenerative" conditions.

The suicide death rate has increased slightly, and the homicide rate shows a small decline. Automobile fatalities have been more frequent than during the corresponding period of any preceding year.

Death rates (annual basis) per 100,000 for principal causes of death

[Industrial department, Metropolitan Life Insurance Co.]

Cause of death	Rate per 100,000 lives exposed [1]				
	April, 1931	March, 1931	April, 1930	Cumulative, January-April	
				1931	1930
Total, all causes	975.1	1,016.4	991.1	1,004.3	971.3
Typhoid fever	.9	.9	1.1	1.1	1.2
Measles	5.9	5.5	6.6	4.3	4.0
Scarlet fever	4.2	4.3	4.1	4.1	3.9
Whooping cough	2.8	3.8	4.5	3.8	4.8
Diphtheria	3.0	4.9	6.3	5.1	8.4
Influenza	33.0	52.2	20.1	44.0	25.9
Tuberculosis (all forms)	80.5	87.1	91.9	82.3	86.5
Tuberculosis of respiratory system	70.0	79.1	78.7	73.2	75.2
Cancer	82.8	83.6	79.8	83.9	76.9
Diabetes mellitus	22.9	23.8	19.9	24.1	20.9
Cerebral hemorrhage	68.8	64.5	66.5	68.0	64.6
Organic diseases of heart	168.4	170.3	166.9	171.6	166.1
Pneumonia (all forms)	111.0	126.0	120.7	125.9	117.2
Other respiratory diseases	13.3	13.2	13.7	13.9	13.5
Diarrhea and enteritis	9.4	9.5	11.9	10.1	11.7
Bright's disease (chronic nephritis)	73.7	73.6	77.6	74.5	73.3
Puerperal state	13.3	12.3	11.0	12.2	13.1
Suicides	11.2	9.5	10.5	9.6	9.4
Homicides	6.0	6.9	5.8	6.4	6.7
Other external causes (excluding suicides and homicides)	53.4	47.0	53.2	52.7	56.6
Traumatism by automobiles	18.5	16.3	18.2	18.3	17.6
All other causes	210.7	217.3	219.0	206.7	206.7

[1] All figures in this table include insured infants under one year of age. The rates for 1931 are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.

COURT DECISION RELATING TO PUBLIC HEALTH

Conviction for forgery of narcotic drug prescription and unlawful possession of narcotic drug.—(California District Court of Appeal; People *v.* Brown, 298 P. 503; decided Apr. 17, 1931.) A State law provided a penalty for "Any person who shall forge or alter any prescription for any narcotic drugs specified in section 8 of this act, or who obtains any such drugs by any forged or altered prescription, or who has in possession any such drugs secured by such forged or altered prescription." The defendant was convicted of possessing a preparation of morphine containing more than one-fourth grain of morphine to the avoirdupois ounce and of forging a prescription by which the preparation was obtained. On appeal the district court of appeal, in disposing of the contentions made by the defendant with respect to a narcotic drug prescription not being the subject of forgery and with respect to the failure to allege an intent to defraud, said:

> The argument of appellant proceeds upon the assumption that there is no one to be defrauded by the prescription, and that, in the absence of an intent to defraud, there can be no forgery. The assumption, however, is false. We are all cognizant of the fearful consequences which would attend the unregulated sale of poisons and narcotics, and conscious of the vital interest of the State in a strict supervision thereof. Contemplating, as we may and ought to do, the crimes committed with diabolical cunning and sometimes with fiendish cruelty, partly to satisfy the depraved appetite and partly to satiate or excite a disordered mind, we must conclude that any illegitimate and unlawful use of the habit-forming drugs is an injury to and a fraud upon the public as a whole—the State. * * * We entertain no doubt whatever that a prescription for a poisonous or narcotic drug is the subject of forgery. The intent to defraud is unmistakably made manifest by the act of obtaining the narcotic by means of the false writing. It is alleged that the forged prescription was made use of for that purpose and the drug obtained thereby.

The court also rejected the defendant's claim that the portion of the law which purported to make it a crime to forge or alter a prescription was unconstitutional because not embraced by the title of the act.

DEATHS DURING WEEK ENDED JUNE 6, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended June 6, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce.)

	Week ended June 6, 1931	Corresponding week, 1930
Policies in force	75, 158, 847	75, 759, 190
Number of death claims	13, 200	13, 685
Death claims per 1,000 policies in force, annual rate	9. 2	9. 4

Deaths[1] *from all causes in certain large cities of the United States during the week ended June 6, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended June 6, 1931				Corresponding week, 1930		Death rate[2] for the first 23 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1931	1930
Total (81 cities)	7,868	11.5	664	[4] 51	12.6	751	13.2	13.0
Akron	39	7.9	1	10	8.4	4	8.3	8.4
Albany[4]	45	18.2	2	40	15.5	2	15.3	16.2
Atlanta	76	14.3	8	82	20.5	19	16.2	16.8
White	38		4	63		9		
Colored	38	(6)	4	115	(6)	10	(6)	(6)
Baltimore[5]	223	14.8	22	75	14.4	17	16.2	15.3
White	165		12	52		14		
Colored	58	(6)	10	156	(6)	3	(6)	(6)
Birmingham	71	13.7	4	49	13.6	7	14.9	14.1
White	36		2	34		2		
Colored	35	(6)	2	49	(6)	5	(6)	(6)
Boston	210	13.9	23	66	13.3	24	15.9	15.9
Bridgeport	35	12.4	3	50	7.8	1	12.3	12.8
Buffalo	148	18.3	15	61	14.0	11	14.5	14.4
Cambridge	28	12.8	3	60	14.2	3	13.9	13.5
Camden	20	8.8	4	70	16.2	1	16.3	14.8
Canton	34	16.6	1	23	14.9	6	11.4	11.3
Chicago[5]	730	11.0	47	42	11.1	44	11.5	11.4
Cincinnati	136	15.5	13	78	19.4	16	17.1	16.7
Cleveland	209	12.0	9	26	12.7	16	12.2	12.3
Columbus	85	15.0	6	59	15.6	7	15.0	17.8
Dallas	57	10.9	8		11.1	2	12.2	12.1
White	41		6			1		
Colored	16	(6)	2		(6)	1	(6)	(6)
Dayton	41	10.3	6	84	15.0	6	13.0	10.5
Denver	82	14.7	6	58	14.8	11	15.2	15.3
Des Moines	27	9.7	2	35	13.9	5	11.7	12.6
Detroit	251	7.9	41	65	10.5	45	9.3	10.4
Duluth	16	8.2	1	25	13.9	1	11.3	11.6
El Paso	24	11.9	4		17.7	6	17.2	18.6
Erie	23	10.2	3	56	13.0	0	11.5	11.5
Fall River[5,7]	21	9.5	1	23	10.9	4	13.5	13.8
Flint	23	7.3	3	38	13.2	7	8.0	10.2
Fort Worth	30	9.3	0		12.7	6	12.1	11.7
White	27		0			2		
Colored	3	(6)	0		(6)	4	(6)	(6)
Grand Rapids	46	14.0	3	44	12.0	4	9.9	11.5
Houston	66	11.1	7		9.7	3	11.6	12.7
White	44		6			1		
Colored	22	(6)	1		(6)	2	(6)	(6)
Indianapolis	106	14.9	5	41	15.1	8	14.7	15.5
White	90		4	38		4		
Colored	16	(6)	1	67	(6)	4	(6)	(6)
Jersey City	83	13.6	15	133	11.3	9	13.0	12.7
Kansas City, Kans	31	13.1	8	62	9.4	1	14.4	11.9
White	23		3	74		0		
Colored	8	(6)	0	0	(6)	1	(6)	(6)
Kansas City, Mo	108	13.8	10	76	12.2	10	14.6	13.8
Knoxville	28	13.4	4	85	12.2	5	13.8	15.0
White	18		1	24		5		
Colored	10	(6)	3	611	(6)	0	(6)	(6)
Long Beach	27	9.2	1	24	8.3	2	10.5	10.3
Los Angeles	233	9.2	11	32	13.7	28	11.4	11.6
Louisville	65	11.0	4	34	16.3	6	15.7	14.4
White	48		2	20		6		
Colored	17	(6)	2	133	(6)	0	(6)	(6)
Lowell[7]	19	9.8	3	76	21.2	7	13.4	15.1
Lynn	26	13.2	6	155	12.2	6	11.5	12.0
Memphis	77	15.5	6	63	16.8	6	17.5	18.0
White	40		3	50		3		
Colored	37	(6)	3	87	(6)	3	(6)	(6)
Miami	17	7.9	1	25	13.2	10	13.4	12.3
White	11		0	0		6		
Colored	6	(6)	1	88	(6)	4	(6)	(6)

See footnotes at end of table

Deaths [1] from all causes in certain large cities of the United States during the week ended June 6, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

City	Week ended June 6, 1931				Corresponding week, 1930		Death rate [2] for the first 23 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Milwaukee	105	9.3	8	35	9.7	18	10.2	10.5
Minneapolis	116	12.8	13	84	10.4	2	12.0	11.2
Nashville	43	14.4	7	104	18.3	6	17.5	16.7
White	32		5	100		3		
Colored	11	(6)	2	118	(6)	3	(6)	(6)
New Bedford [7]	32	14.8	3	80	16.2	1	13.7	12.8
New Haven	21	6.7	0	0	9.9	0	12.9	14.6
New Orleans	154	17.2	16	88	18.5	14	18.2	18.9
White	83		9	74		8		
Colored	71	(6)	7	114	(6)	6	(6)	(6)
New York	1,380	10.1	108	45	11.1	119	12.7	12.0
Bronx Borough	180	7.1	15	31	8.1	10	9.1	8.6
Brooklyn Borough	462	9.2	45	48	9.6	49	11.7	11.1
Manhattan Borough	520	14.9	37	63	16.9	51	19.4	18.0
Queens Borough	163	7.4	9	25	7.2	6	8.1	7.8
Richmond Borough	55	17.5	2	36	18.0	3	14.4	15.2
Newark, N. J	109	12.3	5	20	12.4	11	13.1	13.7
Oakland	55	9.8	1	13	9.7	2	11.3	11.7
Oklahoma City	34	9.0	4	55	16.4	12	12.1	10.4
Omaha	51	12.3	8	90	13.1	4	14.7	14.0
Paterson	38	14.3	1	17	12.0	2	15.0	13.6
Philadelphia	464	12.3	41	60	11.1	30	15.1	13.7
Pittsburgh	175	13.5	20	69	13.6	16	16.7	15.3
Portland, Oreg	68	11.5	5	61	14.1	3	12.5	13.2
Providence	48	9.8	8	74	11.1	8	14.5	14.9
Richmond	60	17.0	5	73	14.2	8	17.1	16.0
White	39		3	66		6		
Colored	21	(6)	2	87	(6)	2	(6)	(6)
Rochester	72	11.3	5	46	14.3	6	13.3	12.7
St. Louis	232	14.6	6	20	14.5	10	16.8	14.7
St. Paul	53	10.0	0	0	9.9	4	11.4	10.9
Salt Lake City [5]	17	6.2	1	15	14.4	2	13.0	13.8
San Antonio	81	17.6	18		21.7	26	16.2	18.6
San Diego	42	14.0	3	61	13.3	2	14.0	14.0
San Francisco	170	13.6	12	80	13.3	5	13.9	13.7
Schenectady	11	6.0	1	20	9.3	1	11.2	12.4
Seattle	78	10.9	5	47	10.8	4	12.5	11.6
Somerville	12	5.9	3	112	8.5	0	10.7	11.6
South Bend	15	7.2	1	25	7.5	1	8.9	9.5
Spokane	25	11.2	2	52	13.5	3	12.9	13.4
Springfield, Mass	29	9.9	3	40	14.2	5	13.6	13.8
Syracuse	46	11.3	4	47	14.1	5	12.6	13.2
Tacoma	18	8.7	2	51	10.2	0	13.8	13.1
Toledo	91	16.1	4	37	13.8	9	13.0	13.8
Trenton	37	15.6	2	35	27.5	6	19.1	18.1
Utica	28	14.3	1	26	11.3	0	15.7	16.7
Washington, D. C	118	12.5	11	61	16.1	12	17.3	16.0
White	74		6	49		6		
Colored	44	(6)	5	86	(6)	6	(6)	(6)
Waterbury	12	6.2	2	60	11.5	4	10.6	10.4
Wilmington, Del.[7]	26	12.7	2	43	17.1	4	15.8	15.7
Worcester	36	9.5	3	41	12.0	6	14.1	14.7
Yonkers	25	9.4	4	105	5.8	2	9.5	8.7
Youngstown	25	7.5	1	14	9.2	2	11.0	11.0

[1] Deaths of nonresidents are included. Stillbirths are excluded.

[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.

[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.

[4] Data for 76 cities.

[5] Deaths for week ended Friday.

[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Forth Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32, and Washington, D. C., 25.

[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended June 13, 1931, and June 14, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 13, 1931, and June 14, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 13, 1931	Week ended June 14, 1930	Week ended June 13, 1931	Week ended June 14, 1930	Week ended June 13, 1931	Week ended June 14, 1930	Week ended June 13, 1931	Week ended June 14, 1930
New England States:								
Maine	7	23	1	2	24	77	1	1
New Hampshire		1			14	27	0	0
Vermont					54	25	0	0
Massachusetts	36	39		4	586	1, 224	1	5
Rhode Island	6			1	137	29	0	0
Connecticut	1	20	2	1	241	41	0	3
Middle Atlantic States:								
New York	105	128	[1] 7	[1] 4	2, 441	2, 425	6	11
New Jersey	42	89	7	5	860	1, 260	4	3
Pennsylvania	67	87			2, 405	1, 106	6	10
East North Central States:								
Ohio	45	46	28	12	1, 474	651	4	6
Indiana	18	4	2		380	129	5	1
Illinois	105	153	11	33	1, 556	404	14	8
Michigan	28	51	4		298	728	4	22
Wisconsin	4	6	13	7	1, 062	418	3	1
West North Central States:								
Minnesota	12	7	1	3	127	106	6	2
Iowa	3	4			26	87	0	1
Missouri	17	27			162	40	1	3
North Dakota	1	3			15	17	1	1
South Dakota	3	3	1		12	228	0	1
Nebraska	5	6	2		8	49	1	1
Kansas	14	14	1	2	116	333	0	2
South Atlantic States:								
Delaware	2	1			65	6	0	0
Maryland [2] [3]	11	19	7	9	477	26	0	0
District of Columbia	13	4			83	56	0	1
West Virginia	11	6	7	2	164	34	1	0
North Carolina [3]	14	12	1	2	542	74	4	0
South Carolina	10	9	176	174	164	79	1	1
Georgia [3]	3	4	13	10	70	92	0	2
Florida	6	5		1	50	82	0	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever: 1931, 9 cases; 1 case in Maryland; 1 case in North Carolina; 2 cases in Georgia: and 5 cases in Texas.

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Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 13, 1931, and June 14, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 13, 1931	Week ended June 14, 1930	Week ended June 13, 1931	Week ended June 14, 1930	Week ended June 13, 1931	Week ended June 14, 1930	Week ended June 13, 1931	Week ended June 14, 1930
East South Central States:								
Kentucky	7				90	24	3	0
Tennessee	5	6	9	11	60	77	0	2
Alabama	5	5	12	11	40	107	0	0
Mississippi	1	8					1	3
West South Central States:								
Arkansas	1		4	4	25	18	0	5
Louisiana	11	25	3	5	5	19	2	0
Oklahoma [4]	12	8	17	25	32	82	0	3
Texas [3]	21	13	4	23	77	103	2	0
Mountain States:								
Montana					12	25	0	0
Idaho					1	4	1	0
Wyoming					13	51	0	0
Colorado	5	7			96	320	0	3
New Mexico	4	8			47	43	0	1
Arizona			1		23	75	1	0
Utah [2]	1				4	192	0	1
Pacific States:								
Washington	5	1			74	516	0	4
Oregon	2	4	12	6	47	95	0	0
California	60	44	32	13	730	1,470	1	4

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 13, 1931	Week ended June 14, 1930	Week ended June 13, 1931	Week ended June 14, 1930	Week ended June 13, 1931	Week ended June 14, 1930	Week ended June 13, 1931	Week ended June 14, 1930
New England States:								
Maine	0	0	22	10	0	0	7	6
New Hampshire	0	0	1	8	0	0	0	0
Vermont	0	0	4	8	8	0	0	0
Massachusetts	2	0	195	150	0	0	2	2
Rhode Island	0	0	31	11	0	0	0	1
Connecticut	0	2	26	43	0	0	2	0
Middle Atlantic States:								
New York	5	2	610	287	3	5	18	18
New Jersey	0	0	219	144	0	0	2	5
Pennsylvania	1	2	430	270	0	0	11	13
East North Central States:								
Ohio	1	3	352	252	20	119	7	11
Indiana	0	0	99	75	101	106	0	3
Illinois	1	1	401	325	60	90	6	10
Michigan	3	1	384	215	30	41	5	4
Wisconsin	1	1	90	126	6	17	3	2
West North Central States:								
Minnesota	2	2	67	61	5	8	0	1
Iowa	0	0	42	35	61	147	2	1
Missouri	1	0	68	94	37	41	5	10
North Dakota	2	0	12	20	7	20	0	1
South Dakota	1	1	4	5	2	21	1	0
Nebraska	0	0	32	13	20	39	0	1
Kansas	0	1	25	52	64	98	4	8
South Atlantic States:								
Delaware	0	0	9	5	0	0	0	0
Maryland [2, 3]	0	0	28	65	0	0	6	7
District of Columbia	0	0	10	16	0	0	0	0
West Virginia	0	0	26	24	3	10	8	25
North Carolina [3]	0	2	25	21	1	13	18	27
South Carolina	3	1	1	4	2	0	24	73
Georgia [3]	1	0	28	10	0	0	23	17
Florida	0	0	1	3	0	1	1	7

[2] Week ended Friday.
[3] Typhus fever 1931, 9 cases; 1 case in Maryland; 1 case in North Carolina; 2 cases in Georgia; and 5 cases in Texas.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 13, 1931, and June 14, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 13, 1931	Week ended June 14, 1930	Week ended June 13, 1931	Week ended June 14, 1930	Week ended June 13, 1930	Week ended June 14, 1930	Week ended June 13, 1931	Week ended June 14, 1930
East South Central States:								
Kentucky	0	0	28	27	24	5	5	4
Tennessee	1	0	12	15	4	11	12	21
Alabama	1	0	13	6	3	2	20	12
Mississippi	0	0	7	1	17	2	13	23
West South Central States:								
Arkansas	1	0	3	1	40	5	4	4
Louisiana	1	11	21	6	17	3	17	43
Oklahoma [4]	1	3	11	28	56	122	10	10
Texas [3]	0	1	45	13	135	32	11	5
Mountain States								
Montana	1	0	13	15	7	3	2	0
Idaho	1	0	1	3	1	0	0	0
Wyoming	0	0	11	4	0	20	0	1
Colorado	2	0	14	10	0	8	1	2
New Mexico	0	0	7	3	0	2	1	2
Arizona	0	0	2	1	0	1	7	4
Utah [2]	0	0	3	0	1	1	1	0
Pacific States.								
Washington	1	0	20	26	28	30	6	3
Oregon	0	0	13	15	12	16	2	6
California	5	36	96	112	17	31	18	16

[2] Week ended Friday.
[3] Typhus fever. 1931, 9 cases 1 case in Maryland, 1 case in North Carolina, 2 cases in Georgia, and 5 cases in Texas
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
May, 1931										
Arkansas	2	10	65	42	212	330	1	50	166	24
Maine	3	23	18		68		0	145	0	5
Massachusetts	8	152	23	1	2, 299	1	3	1, 542	0	21
Nebraska	9	26	12		49		0	198	233	3
New Hampshire		6						11		
North Dakota	8	30	8		302		0	145	22	5
Ohio	15	134	104	1	5, 627	1	5	1, 824	192	38
Tennessee	31	42	336	97	1, 701	73	4	414	100	32
Vermont		2			69		0	22	18	2

May, 1931	Cases
Anthrax:	
Massachusetts	1
Chicken pox:	
Arkansas	109
Maine	166
Massachusetts	1, 138
Nebraska	329
North Dakota	131
Ohio	1, 916
Tennessee	188
Vermont	127
Conjunctivitis:	
Maine	5
Diarrhea and enteritis (under 2 years):	
Ohio	9
Dysentery	
Massachusetts	2
Ohio	2
Tennessee	7
Food poisoning	
Ohio	8
German measles	
Maine	10
Massachusetts	602
Ohio	268
Tennessee	37
Hookworm disease.	
Arkansas	1
Lead poisoning	
Massachusetts	2
Ohio	7

Lethargic encephalitis:	Cases
Maine	1
North Dakota	3
Ohio	3
Tennessee	1
Mumps.	
Arkansas	67
Maine	246
Massachusetts	644
Nebraska	655
North Dakota	113
Ohio	2,511
Tennessee	164
Vermont	95
Opthalmia neonatorum:	
Arkansas	2
Massachusetts	122
Ohio	79
Tennessee	3
Paratyphoid fever:	
Arkansas	3
Maine	1
Ohio	1
Puerperal septicemia	
Ohio	5
Tennessee	1
Septic sore throat	
Massachusetts	15
Ohio	86
Tennessee	10

Tetanus:	Cases
Ohio	4
Tennessee	1
Trachoma	
Arkansas	3
Maine	5
Massachusetts	8
Ohio	1
Tennessee	1
Trichinosis	
Massachusetts	5
Ohio	1
Tularaemia	
Tennessee	4
Undulant fever	
Arkansas	1
North Dakota	2
Ohio	10
Vermont	2
Vincent's angina:	
Maine	2
North Dakota	22
Tennessee	3
Whooping cough:	
Arkansas	68
Maine	103
Massachusetts	626
Nebraska	111
North Dakota	51
Ohio	481
Tennessee	291
Vermont	42

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 98 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,480,000. The estimated population of the 91 cities reporting deaths is more than 31,935,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended June 6, 1931, and June 7, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	836	950	
98 cities	427	471	712
Measles:			
44 States	18,417	15,290	
98 cities	7,037	5,893	
Meningococcus meningitis.			
46 States	92	126	
98 cities	40	64	
Poliomyelitis			
46 States	26	52	
Scarlet fever			
46 States	4,207	2,882	
98 cities	1,990	1,314	1,135
Smallpox			
46 States	872	1,054	
98 cities	93	125	50
Typhoid fever:			
46 States	242	343	
98 cities	40	51	45
Deaths reported			
Influenza and pneumonia.			
91 cities	566	534	
Smallpox:			
91 cities	0	0	

City reports for week ended June 6, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	10	0	0		0	1	6	2
New Hampshire								
Concord	0	0	0		0	20	0	0
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	2	0	1		0	0	0	0
Massachusetts:								
Boston	95	29	6	1	0	64	10	33
Fall River	6	2	2		0	28	1	0
Springfield	0	2	0		0	18	11	1
Worcester	23	3	5		0	4	37	0
Rhode Island								
Pawtucket	0	1	0		0	0	0	0
Providence	7	5	4		0	105	25	2
Connecticut								
Bridgeport	0	4	2		1	7	2	3
Hartford	1	4	0	1	0	8	2	7
New Haven	30	1	0		0	133	10	2
MIDDLE ATLANTIC								
New York:								
Buffalo	27	8	2		2	215	35	23
New York	407	231	141	8	4	1,416	87	135
Rochester	16	5	0		0	177	13	4
Syracuse	15	2	0		0	32	0	0
New Jersey:								
Camden	8	6	0		0	2	1	1
Newark	79	12	6	2	0	27	11	6
Trenton	2	2	1		0	10	7	3
Pennsylvania:								
Philadelphia	83	52	5	4	5	439	47	32
Pittsburgh	51	15	7	2	0	101	90	22
Reading	12	1	1		0	14	3	3
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	12	5	1		0	92	15	6
Cleveland	186	22	13		1	390	336	18
Columbus	20	3	1		1	10	5	1
Toledo	57	4	1	2	2	6	26	4
Indiana:								
Fort Wayne	3	1	3		0	8	0	2
Indianapolis	32	2	0		0	213	27	9
South Bend	2	1	0		1	12	0	0
Terre Haute	1	0	0		0	10	0	4
Illinois:								
Chicago	155	81	81	3	1	1,041	79	37
Springfield	17	0	0		0	16	7	1
Michigan:								
Detroit	134	41	22	3	0	46	61	10
Flint	36	1	0		0	2	13	2
Grand Rapids	0	1	0		0	70	0	1

City reports for week ended June 6, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	1	0	0		0	1	91	1
Madison	22	0	3			1	45	
Milwaukee	107	11	2		0	466	348	2
Racine	16	1	1		0	3	25	1
Superior	2	0	0		0	1	1	2
WEST NORTH CENTRAL								
Minnesota:								
Duluth	18	0	0		0	0	2	0
Minneapolis	160	11	5		2	194	199	12
St. Paul	74	7	3		0	45	5	7
Iowa:								
Davenport	0	0	0			0	1	
Des Moines	0	1	1			0	0	
Sioux City	7	0	0			2	16	
Waterloo	2	0	0			2	0	
Missouri:								
Kansas City	12	2	0		0	162	0	4
St. Joseph	0	0	0		0	7	0	2
St. Louis	34	26	16			8	15	9
North Dakota:								
Fargo	2	0	0		0		4	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	8	0	0			6	0	
Sioux Falls	0	0	0			0	0	
Nebraska:								
Omaha	10	2	4		0	1	22	8
Kansas:								
Topeka	10	1	0		0	1	50	1
Wichita	7	1	1		0	5	1	4
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	0		0	10	2	1
Maryland:								
Baltimore	64	18	12	1	2	303	31	12
Cumberland	0	0	0		0	1	0	1
Frederick	0	0	0		0	2	0	0
District of Columbia:								
Washington	19	9	5		0	107	0	4
Virginia:								
Lynchburg	5	0	0		0	3	0	0
Richmond	2	1	0		0	79	0	3
Roanoke	1	1	0		0	9	0	3
West Virginia:								
Charleston	1	0	1	1	1	1	0	1
Wheeling	2	0	0		0	0	1	1
North Carolina:								
Raleigh	0	0	0		0	52	0	1
Wilmington	0	0	0		0	0	0	1
Winston-Salem	5	0	0		1	64	3	0
South Carolina:								
Charleston	0	0	1	37	1	1	0	1
Columbia	0	0	0		0	0	1	5
Georgia:								
Atlanta	2	1	0	4	1	14	0	2
Brunswick	0	0	0		0	0	6	1
Savannah	1	0	0	2	0	3	1	2
Florida:								
Miami	3	2	0		0	95	0	1
Tampa	0	0	1	1	1	7	0	0

City reports for week ended June 6, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
EAST SOUTH CENTRAL								
Kentucky:								
Covington	1	0	1		0	10	0	2
Tennessee:								
Memphis	9	0	0		1	107	4	1
Nashville	0	0	0		0	64	0	3
Alabama:								
Birmingham	7	1	0	2	4	14	1	6
Mobile	0	0	1		1	1	0	0
Montgomery	0	0	0			0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	0			0	0	
Little Rock	2	0	0		0	17	0	0
Louisiana:								
New Orleans	3	7	10		0	1	0	9
Shreveport	0	0	1		0	0	1	3
Oklahoma:								
Muskogee	4	0	0	1		0	0	
Texas:								
Dallas	18	3	2	2	2	12	11	4
Fort Worth	7	1	2		1	2	0	1
Galveston	0	0	0		0	0	0	1
Houston	1	2	3		0	21	1	4
San Antonio	0	2	4		1	24	0	4
MOUNTAIN								
Montana:								
Billings	0	0	15		0	14	0	0
Great Falls	6	0	0		0	0	0	0
Helena	0	0	0		0	7	1	0
Missoula	0	0	0		0	0	0	1
Idaho:								
Boise	0	0	0		0	1	1	0
Colorado:								
Denver	35	8	7		0	62	23	4
Pueblo	0	0	0		0	9	0	0
New Mexico:								
Albuquerque	10	0	0		0	5	2	1
Arizona:								
Phoenix	0	0	0		0	1	0	1
Utah:								
Salt Lake City	24	2	0		0	1	10	2
Nevada:								
Reno	0	0	0		0	6	0	3
PACIFIC								
Washington:								
Seattle	74	2	0			6	43	
Spokane	8	2	0			5	0	
Tacoma	9	1	1		0	0	3	1
Oregon:								
Portland	15	4	1		0	30	10	6
Salem	2	0	0		0	0	7	0
California:								
Los Angeles	29	28	15	14	1	107	16	10
Sacramento	4	2	4	4	0	39	0	2
San Francisco	54	13	5	3	2	104	4	7

City reports for week ended June 6, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	2	7	0	0	0	1	0	0	0	6	31
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	4
Vermont:											
Barre	1	0	0	0	0	1	0	0	0	3	4
Burlington	0	0	0	1	0	0	0	0	0	8	17
Massachusetts:											
Boston	62	83	0	0	0	11	1	0	0	21	210
Fall River	4	2	0	0	0	3	1	0	0	0	21
Springfield	6	10	0	0	0	1	0	0	0	3	23
Worcester	8	25	0	0	0	6	0	0	0	9	36
Rhode Island:											
Pawtucket	2	1	0	0	0	1	0	0	0	0	19
Providence	8	29	0	0	0	1	0	0	0	1	48
Connecticut:											
Bridgeport	7	11	0	0	0	2	0	0	0	1	35
Hartford	3	1	0	0	0	2	0	0	0	3	56
New Haven	4	3	0	0	0	1	1	1	0	8	21
MIDDLE ATLANTIC											
New York:											
Buffalo	21	32	0	1	0	10	0	0	0	18	146
New York	249	384	0	0	0	112	9	9	1	238	1,423
Rochester	9	54	0	0	0	1	0	0	0	14	68
Syracuse	7	21	0	0	0	1	0	0	0	24	46
New Jersey:											
Camden	6	7	0	0	0	0	0	0	0	3	20
Newark	22	34	0	0	0	8	0	0	0	131	115
Trenton	3	2	0	0	0	3	0	1	0	0	37
Pennsylvania:											
Philadelphia	85	144	0	0	0	36	1	1	1	59	464
Pittsburgh	27	114	0	0	0	7	1	1	0	43	175
Reading	4	2	0	0	0	2	0	0	0	1	33
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	14	38	2	0	0	13	1	0	0	6	136
Cleveland	35	57	0	1	0	20	0	0	0	33	209
Columbus	7	5	0	0	0	1	0	0	0	1	85
Toledo	11	12	1	1	0	10	0	0	0	20	91
Indiana:											
Fort Wayne	3	1	2	0	0	0	0	0	0	0	24
Indianapolis	12	36	7	20	0	2	0	0	0	48	------
South Bend	3	3	0	0	0	0	0	0	0	4	14
Terre Haute	1	6	0	0	0	0	0	0	0	1	20
Illinois:											
Chicago	105	285	1	0	0	45	2	0	0	102	730
Springfield	3	3	0	1	0	1	1	0	0	0	20
Michigan:											
Detroit	100	188	1	1	0	9	1	2	0	164	251
Flint	11	19	2	0	0	2	0	0	0	10	23
Grand Rapids	9	14	0	3	0	4	0	0	0	13	40
Wisconsin:											
Kenosha	1	6	0	0	0	1	0	0	0	6	8
Madison	3	6	0	0	------	------	0	0	------	5	------
Milwaukee	28	19	0	0	0	6	0	0	0	41	105
Racine	3	15	0	0	0	2	0	0	0	19	18
Superior	2	0	0	0	0	0	0	0	0	0	7
WEST NORTH CENTRAL											
Minnesota:											
Duluth	7	0	0	0	0	0	0	0	0	0	16
Minneapolis	28	16	1	1	0	1	0	8	0	81	116
St. Paul	18	5	0	0	0	2	0	0	0	14	26

City reports for week ended June 6, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—con.											
Iowa:											
Davenport	0	1	1	9			0	0		0	
Des Moines	6	4	2	15			0	0		0	27
Sioux City	1	10	1	0			0	0		6	
Waterloo	2	1	0	0			1	0		16	
Missouri:											
Kansas City	10	8	0	0	0	10	0	1	0	10	108
St Joseph	1	5	0	0	0	0	0	0	0	0	16
St. Louis	23	74	2	2	0	13	1	1	0	44	232
North Dakota:											
Fargo	0	3	0	0	0	0	0	0	0	0	8
Grand Forks	0	0	0	0			0	0		0	
South Dakota:											
Aberdeen	1	0	0	0			0	0		0	
Sioux Falls	1	0	0	0			0	0		0	8
Nebraska:											
Omaha	3	9	3	5	0	3	0	0	0	2	51
Kansas:											
Topeka	2	0	0	1	0	0	0	0	0	0	6
Wichita	2	4	1	13	0	1	0	0	0	6	38
SOUTH ATLANTIC											
Delaware:											
Wilmington	3	5	0	0	0	0	0	0	0	2	26
Maryland:											
Baltimore	31	35	0	0	0	26	0	1	0	43	223
Cumberland	0	0	0	0	0	0	0	0	0	0	11
Frederick	0	0	0	0	0	0	0	0	0	0	
District of Columbia.											
Washington	18	16	1	0	0	6	3	0	0	15	118
Virginia:											
Lynchburg	1	0	0	0	0	1	0	0	0	0	10
Richmond	2	8	0	0	0	2	1	0	0	1	60
Roanoke	0	0	0	0	0	2	0	0	0	0	20
West Virginia											
Charleston	0	0	0	0	0	2	0	0	0	3	21
Wheeling	1	1	0	0	0	0	0	0	0	0	23
North Carolina:											
Raleigh	0	1	0	0	0	2	0	1	0	15	19
Wilmington	0	0	0	0	0	0	0	0	0	0	5
Winston-Salem	0	0	0	0	0	1	1	0	0	15	17
South Carolina:											
Charleston	0	0	0	0	0	0	0	0	0	0	22
Columbia	0	0	0	0	0	1	1	0	0	0	23
Georgia.											
Atlanta	4	31	3	9	0	6	0	4	0	13	76
Brunswick	0	0	0	0	0	0	1	0	0	0	5
Savannah	0	0	0	0	0	3	1	3	1	8	24
Florida:											
Miami	0	0	0	0	0	2	1	0	0	1	17
Tampa	0	3	0	0	0	2	0	1	0	0	27
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	7	0	0	0	0	0	0	0	0	24
Tennessee.											
Memphis	3	8	0	1	0	8	3	1	0	33	77
Nashville	1	6	1	2	0	1	2	0	0	3	43
Alabama:											
Birmingham	0	5	2	0	0	4	1	0	0	12	71
Mobile	0	0	0	0	0	0	1	1	0	0	18
Montgomery	0	0	0	0			0	1		0	

City reports for week ended June 6, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	1			1	0		2	
Little Rock	0	0	0	0	0	2	1	1	0	0	2
Louisiana:											
New Orleans	6	5	0	5	0	16	3	0	0	2	154
Shreveport	0	0	0	0	0	4	0	0	2	6	28
Oklahoma:											
Muskogee	0	0	2	1			0	0		0	
Texas:											
Dallas	2	4	2	1	0	6	1	0	0	23	57
Forth Worth	2	6	2	5	0	2	0	0	0	0	30
Galveston	0	0	0	0	0	1	0	1	0	0	21
Houston	1	2	1	5	0	5	0	1	0	1	66
San Antonio	1	1	0	0	0	5	1	0	0	0	81
MOUNTAIN											
Montana:											
Billings	1	0	0	0	0	0	0	0	0	1	10
Great Falls	1	1	0	0	0	1	0	0	0	7	10
Helena	0	0	0	0	0	0	0	0	0	0	6
Missoula	0	1	0	0	0	0	0	0	0	0	9
Idaho:											
Boise	0	0	0	2	0	0	0	0	0	1	1
Colorado:											
Denver	10	7	0	1	0	6	0	2	0	48	77
Pueblo	1	1	1	0	0	1	0	0	0	2	11
New Mexico:											
Albuquerque	1	0	0	0	0	3	0	0	0	0	12
Arizona:											
Phoenix	1	0	0	0	0	2	0	0	0	0	
Utah:											
Salt Lake City	2	2	0	0	0	0	0	0	0	8	17
Nevada:											
Reno	0	0	0	0	0	1	0	0	0	0	10
PACIFIC											
Washington:											
Seattle	7	7	1	0			0	2		93	
Spokane	4	1	5	8			0	0		0	
Tacoma	3	1	3	1	0	1	0	0	0	2	18
Oregon:											
Portland	3	2	9	8	0	3	0	0	0	0	68
Salem	0	0	0	0	0	0	0	0	0	0	
California:											
Los Angeles	27	22	5	8	0	14	1	0	0	0	233
Sacramento	2	2	1	0	0	3	0	0	0	6	30
San Francisco	28	11	1	0	0	12	1	0	1	0	147

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis: Cases	Poliomyelitis: Deaths
NEW ENGLAND									
Massachusetts:									
Boston	2	1	0	0	1	0	0	0	1
Worcester	1	0	1	1	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	0	0	1	0	0	0	0	0
New York	7	0	2	2	0	0	1	1	0
New Jersey:									
Newark	1	0	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	5	3	0	0	1	1	0	1	0
Pittsburgh	1	1	0	1	0	0	0	0	0

City reports for week ended June 6, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cleveland	0	0	0	0	0	1	0	0	0
Toledo	0	0	2	0	0	0	0	0	0
Indiana:									
Indianapolis	0	1	0	0	0	0	0	0	0
Illinois:									
Chicago	10	6	1	0	0	0	0	0	0
Michigan:									
Detroit	0	0	1	0	0	0	0	0	0
Flint	1	1	0	1	0	0	0	0	0
Grand Rapids	0	0	0	1	0	0	0	0	0
Wisconsin:									
Racine	0	0	0	1	0	0	0	0	0
WEST NORTH CENTRAL									
Missouri:									
St. Louis	2	0	0	0	0	0	0	0	0
Nebraska:									
Omaha	1	0	0	0	0	0	0	0	0
Kansas:									
Topeka	0	0	0	0	1	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	3	0	0	0	0	0	0	0	0
District of Columbia:									
Washington	1	1	0	0	0	0	0	0	0
North Carolina:									
Wilmington	0	0	0	0	0	1	0	0	0
Winston-Salem	0	1	0	0	0	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	1	0	0	0	0
Columbia	0	2	0	0	0	0	0	0	0
Georgia:									
Atlanta	0	0	0	1	0	0	0	0	0
Brunswick	0	0	0	0	0	2	0	0	0
Savannah [1]	0	0	0	0	8	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	0	0	0	0	0	1	0	0	0
Alabama: [2]									
Mobile	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	1	0	0	0	2	2	0	0	0
Shreveport	0	0	0	0	0	1	0	0	0
Texas:									
Dallas	1	0	0	0	0	0	0	0	0
Fort Worth [1]	0	0	0	0	0	1	0	0	0
San Antonio	2	0	0	0	0	0	0	0	0
MOUNTAIN									
Utah:									
Salt Lake City	1	1	0	0	0	0	0	1	1
PACIFIC									
Washington:									
Tacoma	0	0	0	0	0	0	0	1	0
California:									
Los Angeles	0	0	0	0	0	0	1	2	3
San Francisco	0	0	1	1	0	1	1	0	0

[1] Typhus fever: 3 cases; 2 cases at Savannah, Ga., and 1 case at Fort Worth, Tex.
[2] Rabies (in man): 1 death at Birmingham, Ala.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended June 6, 1931, compared with those for a like period ended June 7, 1930. The population figures used in computing the rates are estimated midyear populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, May 3 to June 6, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930	May 30, 1931	May 31, 1930	June 6, 1931	June 7, 1930
98 cities	[2] 67	77	63	71	62	79	59	76	67	75
New England	38	65	38	106	48	68	50	56	46	91
Middle Atlantic	61	85	58	74	63	76	58	67	74	68
East North Central	82	103	72	91	67	115	81	110	75	112
West North Central	71	45	71	74	75	72	54	77	55	52
South Atlantic	63	62	55	54	38	54	41	60	39	54
East South Central	41	6	17	36	12	24	17	36	12	12
West South Central	108	73	81	66	81	52	54	49	68	38
Mountain	[2] 27	70	61	35	61	53	52	41	191	18
Pacific	61	49	74	43	72	59	37	67	49	65

MEASLES CASE RATES

	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930	May 30, 1931	May 31, 1930	June 6, 1931	June 7, 1930
98 cities	[2] 1,304	1,411	1,403	1,255	1,372	1,159	1,111	911	1,096	934
New England	1,063	2,303	1,166	1,843	1,190	1,877	935	1,558	933	1,596
Middle Atlantic	1,433	1,295	1,486	1,337	1,478	1,091	1,187	940	1,101	1,021
East North Central	1,102	927	1,313	814	1,458	685	1,304	521	1,416	512
West North Central	1,016	1,269	1,396	831	1,098	791	641	525	817	420
South Atlantic	3,553	1,298	3,365	1,228	2,840	957	2,089	793	1,473	523
East South Central	1,263	412	1,234	359	1,234	568	1,047	335	1,140	371
West South Central	152	711	166	735	271	517	294	453	254	115
Mountain	[2] 555	9,128	531	6,652	618	7,119	461	5,674	870	5,665
Pacific	501	1,992	554	1,670	456	2,180	492	1,397	511	1,903

SCARLET FEVER CASE RATES

	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930	May 30, 1931	May 31, 1930	June 6, 1931	June 7, 1930
98 cities	[2] 390	258	389	226	367	206	306	182	310	208
New England	630	310	666	261	536	314	351	307	414	252
Middle Atlantic	448	266	439	222	442	201	304	162	355	186
East North Central	439	318	454	308	412	227	438	264	422	293
West North Central	440	238	383	262	340	306	291	213	258	265
South Atlantic	276	242	243	172	241	164	239	126	197	170
East South Central	250	138	337	24	390	102	297	72	151	96
West South Central	105	94	108	73	85	49	51	14	41	73
Mountain	[2] 170	370	157	229	270	300	165	97	104	194
Pacific	106	130	123	128	88	97	110	71	86	93

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931 and 1930, respectively.
[2] Billings, Mont., not included.

*Summary of weekly reports from cities, May 3 to June 6, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—*Continued

SMALLPOX CASE RATES

	Week ended—									
	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930	May 30, 1931	May 31, 1930	June 6, 1931	June 7, 1930
98 cities	[1] 15	24	17	22	16	20	15	15	14	20
New England	0	2	0	0	0	0	0	0	0	0
Middle Atlantic	3	0	1	0	4	0	1	1	0	1
East North Central	6	22	23	16	15	10	11	12	16	8
West North Central	78	101	75	126	67	110	88	56	42	118
South Atlantic	8	0	6	4	6	2	24	10	18	4
East South Central	41	6	12	72	41	30	6	30	17	30
West South Central	64	38	41	21	47	10	37	11	41	21
Mountain	[1] 9	79	17	62	9	70	26	62	26	62
Pacific	12	83	25	47	12	71	12	49	33	59

TYPHOID FEVER CASE RATES

	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930	May 30, 1931	May 31, 1930	June 6, 1931	June 7, 1930
98 cities	[1] 5	6	5	8	6	7	7	7	6	8
New England	5	0	5	10	2	19	2	12	2	5
Middle Atlantic	5	4	5	7	5	4	8	3	5	6
East North Central	2	2	2	2	5	5	2	2	1	4
West North Central	2	8	6	8	10	8	4	10	10	10
South Atlantic	8	16	12	14	12	12	22	11	20	22
East South Central	6	18	17	42	17	21	12	[illegible]	17	12
West South Central	7	3	7	35	7	10	7	21	10	35
Mountain	[1] 0	18	0	0	0	0	17	[illegible]	17	0
Pacific	8	20	0	2	8	[illegible]	2	[illegible]	[illegible]	2

INFLUENZA DEATH RATES

	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930	May 30, 1931	May 31, 1930	June 6, 1931	June 7, 1930
91 cities	[1] 12	9	8	8	7	[illegible]	[illegible]	4	[illegible]	5
New England	5	10	2	0	5	5	10	0	[illegible]	0
Middle Atlantic	11	10	7	7	5	7	3	4	[illegible]	4
East North Central	11	9	5	4	5	[illegible]	5	4	2	4
West North Central	6	3	9	3	3	0	9	3	6	12
South Atlantic	22	6	16	20	4	6	18	4	14	10
East South Central	50	13	50	39	19	19	19	52	38	13
West South Central	14	28	7	4	28	7	14	4	10	11
Mountain	[1] 27	0	9	9	26	9	17	18	0	9
Pacific	7	7	7	12	0	5	5	2	7	2

PNEUMONIA DEATH RATES

	May 9, 1931	May 10, 1930	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930	May 30, 1931	May 31, 1930	June 6, 1931	June 7, 1930
91 cities	[1] 117	133	102	102	95	101	101	[illegible]	[illegible]	83
New England	130	131	113	111	72	109	111	97	120	80
Middle Atlantic	144	176	121	124	121	130	104	86	102	100
East North Central	87	92	74	67	68	70	75	73	59	58
West North Central	121	126	103	108	97	84	133	69	138	132
South Atlantic	130	132	126	170	111	110	132	96	77	102
East South Central	120	142	126	84	120	78	183	97	76	71
West South Central	114	164	114	78	97	82	128	121	86	78
Mountain	[1] 98	123	78	79	70	123	70	79	87	115
Pacific	70	52	55	47	57	37	43	52	48	32

[1] Billings, Mont., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended May 30, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended May 30, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia		7			1
Quebec					2
Ontario			1	3	12
Manitoba	1				
Saskatchewan	2			8	1
Alberta					3
British Columbia					2
Total	3	7	1	11	21

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended June 6, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended June 6, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Mumps	13
Chicken pox	78	Scarlet fever	71
Diphtheria	37	Tuberculosis	62
Erysipelas	4	Typhoid fever	6
German measles	13	Whooping cough	9
Measles	458		

Ontario—Communicable diseases—Five weeks ended May 30, 1931.—During the five weeks ended May 30, 1931, and the corresponding period of 1930, certain diseases were reported in the Province of Ontario, Canada, as follows:

Disease	5 weeks, 1930		5 weeks, 1931	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis	14	7	3	1
Chancroid	1			
Chicken pox	821	1	1,081	
Conjunctivitis			1	
Diphtheria	237	18	157	10
Dysentery				1
Erysipelas	3			
German measles	994		195	
Goiter	3	2	1	
Gonorrhea	194		255	
Influenza	30	10	12	5
Lethargic encephalitis	4	1		
Measles	1,883	2	1,222	1
Mumps	169		451	
Paratyphoid fever			18	1
Pneumonia		236		165
Poliomyelitis	2		3	1
Puerperal septicemia		1		
Scarlet fever	881	11	831	3
Septic sore throat	8			
Smallpox	94		32	
Syphilis	240		248	
Tuberculosis	194	75	175	77
Typhoid fever	36	1	34	3
Undulant fever	5		7	
Whooping cough	231	1	437	6

CHINA

Manchuria—Plague.—The epidemic of bubonic plague which occurred during the months of August and September, 1930, in the Ssupingkai Railroad and Nungan areas of Manchuria, was brought to an end in the middle of October. The total number of deaths reported from plague during this period was 270. The epidemic started in several villages in a locality which borders on inner Mongolia, involving mainly small villages at short distances from the railway. The mortality was reported to have been high.

Harbin—Communicable diseases—December, 1930–February, 1931.—During the months of December, 1930, and January and February, 1931, cases of certain communicable diseases were reported in Harbin, Manchuria, as follows:

Disease	December, 1930	January, 1931	February, 1931
Diphtheria	27	12	17
Dysentery	15	8	11
Meningitis			1
Scarlet fever	35	32	43
Smallpox	4	7	11
Typhoid fever	20	18	28
Typhus fever	13	7	7

Meningitis.—Meningitis has been reported in China as follows:

	Cases	Deaths
Shanghai:		
Week ended—		
Apr. 18, 1931	5	9
Apr. 25, 1931	9	15
May 2, 1931	5	12
May 9, 1931	16	14
May 16, 1931	7	9
May 23, 1931	3	9
Hong Kong:		
Week ended—		
May 16, 1931	1	
May 30, 1931	3	2
Canton:		
Week ended—		
May 16, 1931	12	
May 30, 1931	2	
Amoy: Week ended May 16, 1931	1	

MEXICO

Tampico—Communicable diseases—May, 1931.—During the month of May, 1931, certain communicable diseases were reported in Tampico, Mexico, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	5		Measles	9	1
Diphtheria	2		Tuberculosis	43	38
Enteritis, various	17	51	Typhoid fever	3	5
Influenza	17	1	Whooping cough	53	1
Malaria	121	10			

Vera Cruz—Deaths during year ended June 1, 1931.—During the year ended June 1, 1931, 1,938 deaths were reported in Vera Cruz, Mexico. Deaths from certain diseases were reported as follows:

Disease	Deaths	Disease	Deaths
Cancer	18	Puerperal fever	1
Diphtheria	4	Rabies	1
Dysentery	6	Smallpox	1
Erysipelas	2	Tetanus	13
Influenza	7	Tuberculosis, all forms	237
Leprosy	2	Typhoid and paratyphoid fever	21
Malaria	38	Typhus fever	2
Measles	6	Whooping cough	3

The population of Vera Cruz, according to the 1930 census, was 71,983.

Vera Cruz—Deaths—May 4 to 31, 1931.—During the four weeks ended May 31, 1931, deaths from certain causes were reported in Vera Cruz, Mexico, as follows:

Disease	Deaths	Disease	Deaths
Bronchitis	1	Septicemia	1
Cancer	4	Syphilis	4
Gastro-intestinal disorders	40	Tetanus	2
Malaria	2	Tuberculosis	14
Meningitis	1	All other causes	52
Pneumonia	10		
Pyemia	1	Total	132

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931: 14	March 21	March 28	April, 1931: 4	April 11	April 18	April 25	May, 1931: 2	May 9	May 16	May 23	May 30	June, 1931: 6	June 13
Ceylon: Colombo	C				1											1	P	
China: Canton	C								1						2			
	D														1			
India	C	10,687	15,334	11,544	2,471	857	2,551	2,989	3,161	3,067	2,668							
	D	5,689	8,123	6,131	1,252	473	1,314	1,511	1,571	1,550	1,360							
Bombay	C		21						2									
	D		9						1									
Calcutta	C	28	121	170	80	102	129	125	95	82	62	71	72	89	49			
	D	20	86	112	49	68	69	70	55	51	26	44	39	44	34			
Karikal	C	1		9	2	1	7	2	10	8	1		10		1	1		
	D			8	2	1	7	2	5	8	1		5		1	1		
Madras	C	201	99	72	4	5	7	4	3	1	4	18	18	23	11			
	D	67	47	29	5	3	2		5	1	3	5	6	8	2	1		
Negapatam	D		3	3														
Rangoon	C	1														2		
	D	1	1													1		
Tuticorin	C	1	1	1														
India (French).																		
Chandernagor	C	2	1	5	2	2	2	1	3	2	1		3		1			
	D	3	1	5	2	3	1		3	2			3		1			
Pondicherry	C	31	19	100	29	25	26	20	5	3	5	11	3	8	2	4		
	D	21	11	34	6	5	4	3	1	3						4		
India (Portuguese)	C	1																
Indo-China (see also table below):																		
Paompenh	C		4	9					1	1							1	
	D		2	5		1					1		2				1	
Saigon and Cholon	C	9	6	4	1		1	3	2	3	7	15	25	23	34	22		
	D	4	3	4	2	1	1	1		3	6	13	20	18	25	13		
Persia: Rafsandjan	C												31					
	D												12					

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931			April, 1931				May, 1931					June, 1931	
					14	21	28	4	11	18	25	2	9	16	23	30	6	13
Philippine Islands: [1]																		
Iloilo	C	1	2															
	D	1	2															
Provinces—																		
Capiz	C		59	186	29	11	4	4		3	8	18	11	3		3	4	
	D		47	146	24	10	4	3		3	8	13	11	3		1	4	
Iloilo	C	28	145	95	2	5											8	7
	D	22	110	65	2	2											6	5
Masbate	C				21													
	D				9													
Negros, Occidental	C	120	90	4														
	D	97	56	4														
Negros, Oriental	C		1															
	D		1															
Pampanga	C												1					
Samar	C	17																
	D	9																
Siam	C	2	3	1		4	4	2	1	1	1	13	11					
	D	2	1			1	1					4	3					
Ayudhaya District	C							1										
Bangkok	C	2	3	2		1	1	1	1		1	1	1	1	1			
	D	2	1	1		1	1				1	1			1			
Bismulok Province	C					4	4											
	D					1	1											
On vessel: S. S. Arankola, at Rangoon from Calcutta	C															1		

[1] Figures for cholera in the Philippine Islands are subject to correction.

Place		October, 1930	November, 1930	December, 1930			January, 1931			February, 1931			March 1931		
				1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-28	1-10	11-20	21-31
Indo-China (French) (see also table above):															
Cambodia [1]	C	22	26	28	......	......	7	19	36	71	35	19	14	......	65
Cochin-China [1]	C	28	13	8	......	......	7	4	13	5	5	19	39	......	33

PLAGUE

Place		Dec. 14, 1930-Jan. 10, 1931	Jan. 11-Feb. 7, 1931	Feb. 8-Mar. 7, 1931	Week ended—													
					March, 1931			April, 1931				May, 1931					June, 1931	
					14	21	28	4	11	18	25	2	9	16	23	30	6	13
Algeria.																		
Algiers	C	1	2	1	......	......	......	1	......	......	......	......	......	......	......	......	......	......
	D	......	......	......	......	......	......	1	......	......	......	......	......	......	......	......	......	......
Bone	C	......	1	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Constantine, vicinity of	C	50	1	1	......	......	......	......	......	......	......	......	......	......	......	......	......	......
	D	......	1	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Philippeville	C	1	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......
	D	1	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Argentina:																		
Cordoba Province	C	......	1	2	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Entre Rios Province—Diamante	C	......	......	2	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Jujuy Province—Palpala	C	......	1	1	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Santa Fe	C	......	......	2	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Belgian Congo	C	......	......	......	......	2	......	......	......	......	......	......	......	......	......	......	......	......
	D	......	......	......	......	2	......	......	......	......	......	......	......	......	......	......	......	......
British East Africa (see also table below):																		
Tanganyika	C	2	......	22	......	8	......	......	......	......	3	15	......	5	......	......	......	......
	D	2	......	4	......	1	......	......	......	......	10	11	......	2	......	......	......	......
Uganda	C	67	25	15	4	7	4	4	8	3	10	14	......	......	......	......	......	......
	D	67	24	15	4	7	4	4	8	3	9	12	......	......	......	......	......	......

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931: 14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9	16	23	30	June, 1931: 6	13
Ceylon: Colombo	C	9	8	11	1	3	3	1	1	3			1					
	D	9	6	13	1	3	2	1	1	2			1					
Plague-infected rats			2	3		3	1			1					5			
China: Amoy	C												1					
	D												1					
Dutch East Indies:																		
Batavia and West Java	C	239	180	141	18	31	23	12	19	24	20							
	D	238	168	128	17	28	23	12	18	23	20							
East Java and Madura	C		4	1	1		1	2										
	D		4	1	1		1	2										
Java and Madura	D	615	427	376	65	81	68	63	58	73	70	42						
Egypt:																		
Alexandria	C	3	1	2	1													2
Plague-infected rats		1	1	1														
Assiout	C	7	26	41	6	10	1	1	5	16	8	3	4	5	8	1	4	
	D	1	6	11		4	1	1		11	4	2	2	4	1			
Beni-Suef	C		1								10	2	3		2			
	D		1								3		1		2			
Cairo	C							1										
Deirout	C		21	16								3	7	1		2	3	
	D		4	4								1	2	2			1	
Gharbieh	C		1															1
	D		1															
Girga	C	7	1			14	37	35	31	9	4		1	1	5			
	D	2	1			2	5	17	13	3	5	1	1	1				
Kena	C						5				3				1			
	D						2				1				1			
Manfalut	C	23	30	15	3	5	9											1
	D	5	6	5		2	1											
Minieh	C		2			2	1			1			5		1		3	
	D		1			1	1						2		1		1	
Port Said	C																	
Hawaii Territory: Hamakua—Plague-infected rats																1			

India	C	3,740	5,335	5,457	2,674	2,271	2,462	1,732	2,503	1,603	1,258							
	D	2,226	3,422	3,661	1,887	1,624	2,009	1,526	1,980	1,377	1,092							
Bassein	C	2	4	1								1			1			
	D	1	3	1								1			1			
Bombay	C		1	1	1	1	1	1	4	4	1	2	5		1	1		
	D		1	1		2	1		4	4		3	4	1	1			
Plague-infected rats		38	34	32	17	14	21	18	34	43	30	30	26	30	17	21		
Calcutta	C								1	1								
	D								1	1								
Madras Presidency	C	220	312	74	9	12	7		3					1				
	D	154	182	46	4	12	5		2					1				
Rangoon	C	2	2				1		1				1			1		
	D	1	1				1		1				1			1		
Plague-infected rats		2	4	8				1	1	3			1	1	3	2		
Indo-China (see also table below): Pnompenh	C	1	7	1													1	
	D	1	7	4	2	1	1	2	2	1	1						1	
Iraq: Baghdad	C		5	3	1	3	3	1		5	10	8	7	10	4	2	10	6
	D		4	2		3	1	1		2	5	1	3	4	2		1	4
Madagascar (see also table below): Tamatave	C	2	9															
Morocco	C	19	13															
	D	8	4															
Nigeria. Lagos	C	5	1						2	2	1							
	D	5	1						2	2	1							
Plague-infected rats		5							3	3								
Peru (see table below).																		
Senegal (see table below).																		
Siam	C		4	18	29	2			1				1					
	D		2	14	6	1			1				1					
Bangkok	C	3	8	6	29													
	D	3	8	5	6													
Nagara Rajsima	C	17	9	7			1											
	D	10	10	6														
Syria: Beirut	C	1	1	1														
Tripolitania	C		8	1	1													
	D		3															
Tunisia: Tunis	C	13	1	14		5		5	5	7		4	7		8			
	D			7				4	4	2		2	3					
Union of Socialist Soviet Republics:																		
Gouranduz	D		28															
Transcaucasia—Karabakh	C		6															
Union of South Africa:																		
Cape Province	C							2	1									
Orange Free State	C	2	P	1	2		4	P	1	1								
	D	2		1			1		1	1								
On vessel: S.S. Marionga de Thermiotis at Avonmouth	C	1																

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931
British East Africa (see also table above):							
Kenya	C	62	50	69	21	7	12
Indo-China (see also table above)	C	5	1			4	2
Madagascar (see also table above):							
Ambositra Province	C	44	95	100	92	70	
	D	44	87	96	88	66	
Antsirabe Province	C	18	27	66	84	83	
	D	18	26	57	79	74	
Miarinarivo Province	C	12	18	28	31	19	
	D	12	18	26	29	19	
Moramanga Province	C	19	13	7	7	1	
	D	19	11	5	7	1	
Tananarive Province	C	170	178	92	145	90	
	D	164	172	89	139	81	

Place		Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931
Peru	C	34	41	29	12		
	D	14	13	8	6		
Senegal:							
Baol [1]	D	4					
Dakar [1]	C						2
	D						1
Louga [1]	C	10				14	1
	D	3				6	
Rufisque [1]	C				2		
Thies [1]	C	27	2				
	D	23	1				
Tivaouane [1]	C	21	2				4
	D	25	1				

[1] Reports incomplete.

SMALLPOX

Place		Nov. 16–Dec. 13, 1930	Dec. 11, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931			April, 1931				May, 1931				
						14	21	28	4	11	18	25	2	9	16	23	30
Algeria:																	
Algiers	C		1	1	1			2			2					1	
Bone	C			1													
Constantine	C						1							1			
Oran	C																
Arabia: Aden	C			1	1												
Belgian Congo	C		79	50													
Belgium	C				1												
Brazil: Porto Alegre (alastrim)	C	36		3	7	7	12	16	14	20	19	8	6				
	D				1				1								
British East Africa (see also table below): Tanganyika	C	385	84	70	91	6	2										
	D	36	4	5	13	1	2										
British South Africa: Southern Rhodesia	C	18	18	13													
	D	3															
Canada:																	
Alberta	C	1	19	7	1												
British Columbia	C	1	3	2	8												
Manitoba	C			1	1												
Winnipeg	C		1		1									4			
Nova Scotia	C			1				1									
Ontario	C	23	17	49	29	2	3	3	1	4		6	7	17	5		3
Kingston	C		6	1	1							2	3				
North Bay	C		2		1												
Ottawa	C	12	2	3	1												
Sault Ste. Marie	C		1	30	2					3	1				1		
Toronto	C	4				1		1			4			1			
Quebec	C	2		2													
Saskatchewan	C	18		38	63	40	10	8		5	16	3	22	7	15	18	8
Regina	C				1			2				2		2			
Canary Islands: Las Palmas	C							1									
China																	
Amoy	C							1					2	2			
	D							1					1	1			
Canton	C				3	1	2	2	2	1	2	1				1	2
Chungking	C	P	2														
Foochow	C	P	P	P	P		P		P	P			P				
Hong Kong	C		1	1	9			1	1		1	2					1
	D				3			2				1		1			1

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931 14	21	28	April, 1931 4	11	18	25	May, 1931 2	9	16	23	30
China—Continued.																	
Manchuria—																	
Harbin	C			1	4	1		1									
Kwantung—Dairen	C	4	1					2				1	1				
	D	1															
Nanking	C	P	P	P	P		P	P	P	P	P	P	P	P	P		
Shanghai—																	
Foreigners only	C	8	14	12	16	3	1	1	1	2	1	2	2	1	4	1	1
Including natives	D	4	11	13	14	5	2	2	1	2	7	4	5	1		3	3
Swatow	D	3	5	7	13	3	6	9	8	2							
Tientsin	C	2		1										2			
Chosen (see table below).																	
Colombia: Cali	D	1												1			
Dutch East Indies: Java—Batavia and West Java	C	6	4	29	2	1											
	D		2	2	1												
France (see table below).																	
Great Britain:																	
England and Wales	C	[illegible]	[illegible]65	958	745	171	219	226	179	177	163	212	192	186	166	111	107
Bradford	C		1	4	1		1		1	1		1	4	1	3	1	3
Leeds	C		2						1		1	1		1		1	
London	C	15	161	149	98	26	54	32	35	51	39	84	53	66	44	37	36
London and Great Towns	C	433	560	693	683	117	154	166	117	142	126	162	128	139	108	84	72
	D	1			1							1					
Sheffield	C			3	32	2	1	6	1	4	2	1					
Stoke-on-Trent	C			1	1												
Greece (see table below).																	
Honduras:																	
Amapala	C				1												
Ocotepeque and Gracias districts	C				P												
Puerto Castilla	C		4	11	3												
Tegucigalpa	C											1					
Tela	C									1							
India	C	3,627	5,623	9,623	12,222	3,440	1,695	3,395	3,261	3,980	3,749	3,468					
	D	874	1,381	2,245	2,660	655	303	655	638	807	684	680					
Bassein	C																1
Bombay	C	1	2	7	6	4	1	4	1	2	2	1	3	3		6	1
	D	1	2	1	2		1	2	1	1			4	1	1	1	1

Calcutta	C	18	59	143	251	53	69	75	86	101	60	61	65	24	30	19	
	D	11	40	100	188	36	54	50	63	78	42	50	54	18	25	17	
Cochin	C	22	15	29	59	15	17	14		10	11	12	6	3			
	D	4	1		3												
Karachi	C	3		3	4		3		1		5		1				
	D	1		2				2									
Madras	C	20	4	16	8	6	3	9	4	12	4	1	2	1	3	3	1
	D	3			1		2	1		2	1	1	1		1	5	
Moulmein	C			2													
Negapatam	C	6								1	1		1				
Rangoon	C	1			4	1	1	1		2	2	1	6	7	5		1
	D					1							1	2	1	1	1
Vizagapatam	C			1	8	1		1		2	2	4	2			5	1
	D				2			1		1		1				1	
India (French):																	
Chandernagor	C		5	9	12	3	3	6	2	3	1	4	2	3		4	
	D		3	1	1				2	3	1	2	1	3		2	
Karikal	C		3	5	19			3			1	1	2	1		1	1
	D		2	4	18						1		2	1		1	1
Pondicherry Province	C		34	45	19	7		4	3	3			3	1	2	7	1
	D		32	45	19	7		4	3	3	3		3	1	2	7	1
India (Portuguese)	C		4	5	14		3	5			19	2					
	D				3		1	2			4	2					
Indo-China (see also table below):																	
Pnompenh	C	1	2	1		1										1	
	D	1		1													
Saigon and Cholon	C	2		6	4	4	1	1	2	1					1		1
	D	2		4	1	3	1	2	2	1					1		
Iraq:																	
Baghdad	C				9							1	1				
Mosul Liwa	C	16	1	3	5												
	D	2			1												
Ivory Coast (see table below).																	
Japan:																	
Kobe	C				2												
Taiwan	C			1													
Mexico (see also table below):																	
Jalisco (State)—Guadalajara	D	3		1				1					1	1		1	
Mexico City and surrounding territory	C	6	10		23	13	13	7		17	9	11	6	4	10		
	D	6	6	1	8	5	5	6	6	4	6	4		4	3		
Monterrey	C																1
Torreon	C										1				1		
	D										2						
Vera Cruz	C				3		1	1			1		1	1			
Morocco (see table below).																	
Nicaragua: Porto Cabezas	C		2														
Nigeria. Lagos	C							2									
Panama Canal Zone	C			2													
Poland	C	3	25		1												
Portugal: Lisbon	C	37	72	103	40	16	15	17	4	8	18	11	19	19	14	16	
Siam	C		1	4	2							1					
Somaliland, British: Boales	C	1															
	D		1														

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931 14	March, 1931 21	March, 1931 28	April, 1931 4	April, 1931 11	April, 1931 18	April, 1931 25	May, 1931 2	May, 1931 9	May, 1931 16	May, 1931 23	May, 1931 30
Spain	C	P	P	P	P	P	P	P									
Straits Settlements	C	17	6	7	2			2	1	1		1					
	D	7	3	1	1			1		1	1						
Sudan (Anglo-Egyptian)	C	50	64	11	97	3	1	4					3		3		1
	D	5	6	7	10		1	1									1
Sudan (French) (see table below).																	
Syria (see table below).																	
Tunisia: Tunis	C		17	8				4									
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P	P	P			P	P	P	P	P		P			
Orange Free State	C	P		P	P			P	P	P	P	P		P			
Transvaal	C	P	P	P	P	P		P									
Upper Volta	C	6	4		18			3			3			1	2		85
	D		2					1									1
On vessel:																	
S. S. Clan Mactoggart at Suez	C				2												
S. S. Muncaster Castle at Manila from Hong Kong	C		1														
S. S. Matheran at Suez from Calcutta	C			1													
S. S. Clan Buchanan at Suez	C				2												
S. S. Rotterdam at Naples from Venice	C							1									
S. S. Clan McTavish at Manila from Chittagong	C										1						
S. S. Benvenue at Sydney from Shanghai	C			1													
S. S. Clan MacBrayne at Cochin	C				1												
S. S. Chilka at Rangoon	C				1												
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C												1				
S. S. Talodi at Soakim	C														1		

Place		Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931
British East Africa (see also table above):							
Kenya	C	653					
Chosen	C			1		11	
	D			1		3	
France	C			4	16		
Greece	C		4		4		
Mexico (see also table above)	D		1		3		1
Morocco	C	20	25		4	6	7
Turkey	C	65	116		37	1	
	D	1	9		6		

Place		October, 1930	[illegible]	December, 1930			January, 1931			February, 1931			March, 1931		
				1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-28	1-10	11-20	21-31
Indo-China (see also table above)	C	[illegible]	[illegible]	38	9	14	47	48	46	95	46	27	125		139
Ivory Coast	C	[illegible]	2	9											
Sudan (French)	C	17		43		96							4		P
	D	2		16		4									
Syria: Beirut	C							1							

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Nov. 16-Dec. 13, 1930	Dec. 14, 1930-Jan. 10, 1931	Jan. 11-Feb. 7, 1931	Feb. 8-Mar. 7, 1931	Week ended— March, 1931			April, 1931				May, 1931				
						14	21	28	4	11	18	25	2	9	16	23	30
Algeria.																	
Algiers	C	2			2			3				2	1	3		1	1
Constantine Department	C	2	6	31	4		1		2	2		6	1	8	3	5	
Oran	C	5		3	1							1					
Australia, Western	C		3						1					1			
Bulgaria	C	11	1	13	5				9		26	4			5		
	D								2		3				1		
Chile: Valparaiso	D						1										

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931: 14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9	16	23	30
China:																	
Canton	C			2		1											
Manchuria—Harbin	C	1		3	5			3				8					
Shanghai	C			2													
Tientsin	C	1								1	1						
Chosen (see table below).																	
Czechoslovakia (see table below).																	
Egypt:																	
Alexandria	C	2									1						
	D											1					
Beheira Province	C		1							3	1						
	D		1							2							
Cairo	C	1	1	1													
Port Said	[illegible]			1													
Eritrea: Asmara	[illegible]					1											
Great Britain: Scotland	C			1													
Glasgow	C			2													
	D			1													
Greece (see table below).																	
Guatemala.[1]																	
Iraq: Baghdad	C				5	1								2			
	D				1									2			
Irish Free State:																	
Kerry County—Dingle	C													1			
Mayo County—Belmullet	C										1						
Latvia (see table below).																	
Lithuania (see table below).																	
Mexico (see also table below):																	
Durango	D			1													
Mexico City, including municipalities in Federal District	C	14	12	39	35	46	66	73	31	67	34	33	31	16	27		
	D	7	10	34	16	20	13	31	20	18	7	17	14	9	7		
San Luis Potosi	D	2			5	1	1	2	1	1	2					1	1
Morocco	C	1	8	8	28	2	2	3			1		12		13	29	
	D			2	1								1		2	2	
Palestine	C	7	4	2	3	2	1	1	1	1	2		2	2	1	1	
Panama Canal Zone—Balboa	C														1		

[illegible]guay: Asuncion	D			4	1	1											
Poland	C	42	63	106	159	62	58	55	82	93	176	140	129	92	81	58	
	D	7	3	8	19	4		7	4	8	7	6	7	6	4	5	
Portugal: Oporto	C	6		1													
Rumania	C	34	113	193	152	55	53	52	54	70							
	D	3	5	16	24	4	5	3	4	8							
Spain	C	1															
	D	[illegible]															
Syria	C														1	3	
Tunisia:																	
Sbeitla, vicinity of	C	[illegible]							20	2			10				
	D	[illegible]							7								
Sfax	C	[illegible]						2									
Tunis	C	[illegible]		16	18	5	2	7		2		1	10	12	9	8	
	D	[illegible]												1	2		
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C	[illegible]	P	P	P	1		P	P	P	P	P		P			
Municipality of East London	C	[illegible]	3	8				P	P								
Natal	C	[illegible]	P	P	P		1	P	P	P	P	P					
Orange Free State	C	[illegible]	P	P	P	P				P	P	P					
Transvaal	C	[illegible]	P	P	P	P		P	P	P	P	P		P			
Yugoslavia (see table below).																	

Place		Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931
Chosen: Seoul	C	1	1	1		3	
Czechoslovakia	C	16	24	60	26		
Greece	C	4	10	10	17	8	
	D			2	2	1	
Latvia	C				12		

Place		Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931
Lithuania	C	5	6	26	3	22	32
	D	1	3	3	1	2	3
Mexico (see also table above)	D	47	47				
Turkey	C	3	2		18		
Yugoslavia	C	2	1	20	12	10	43
	D		1	2		1	5

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reports an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931 14	March, 1931 21	March, 1931 28	April, 1931 4	April, 1931 11	April, 1931 18	April, 1931 25	May, 1931 2	May, 1931 9	May, 1931 16	May, 1931 23	May, 1931 30
Brazil:																	
Bahia State	C					1	1										
Ceara State	C			1		2							2		1		
	D			1									2		1		
Minas Geraes State	C						2			1		2	2	1		1	
	D						1					1	1	1			
Rio de Janeiro State	C						1								1	1	
	D				1	1	1										
Cambucy	C			3	2	1											
	D			3	1												
Friburgo (imported)	C			1													
Padua	C			2	1												
				2	1												
British Cameroon: Mamfe															3		1
															1		